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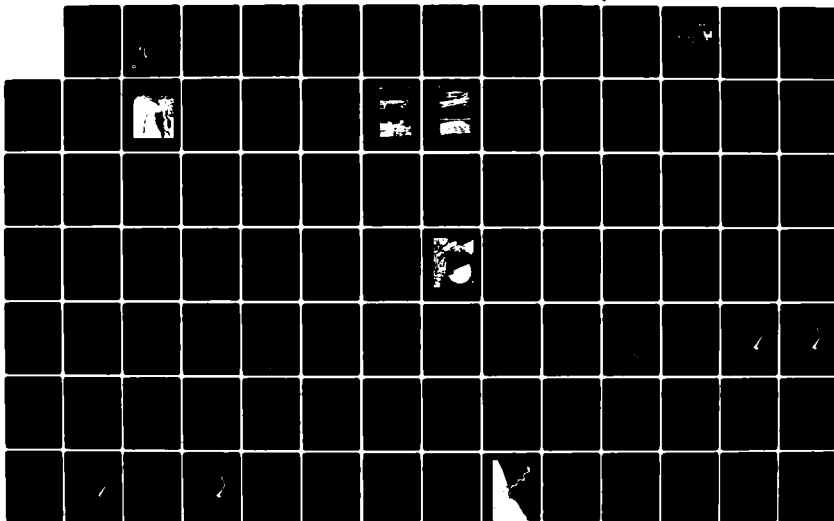
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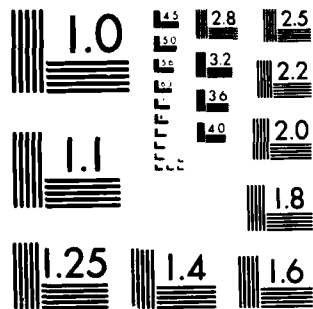
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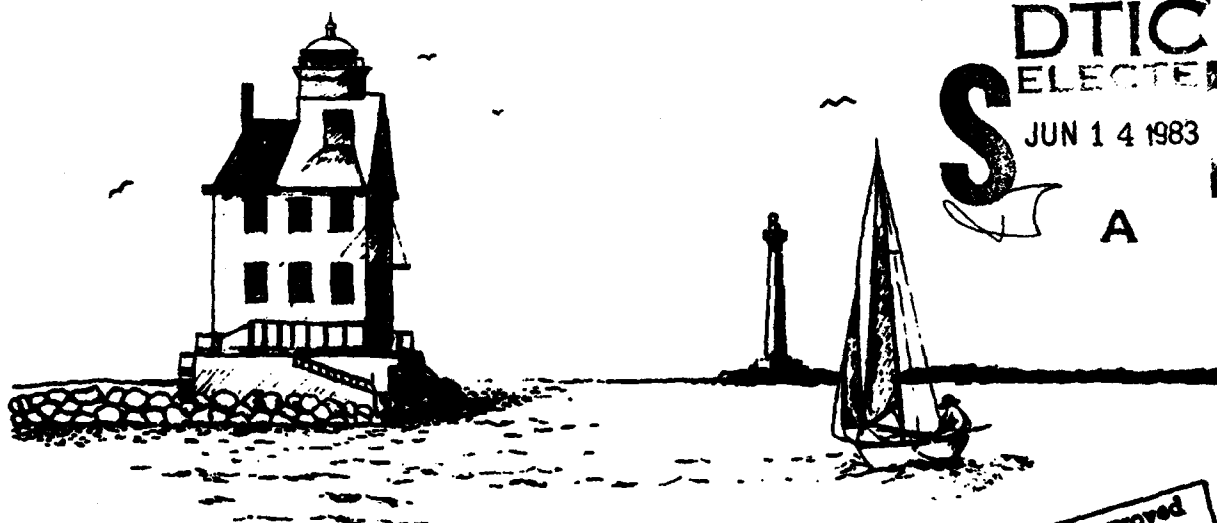
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Lorain Small-Boat Harbor Lorain, Ohio

Volume II

Main Report and Draft Environmental Impact Statement



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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
	AD-A129244	
4. TITLE (and Subtitle) Draft Final Feasibility Report, Lorain Small-Boat Harbor Lorain, Ohio-Volume II:Main Report and DEIS.		5. TYPE OF REPORT & PERIOD COVERED Draft
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. Army Engineer District, Buffalo 1776 Niagara St. Buffalo, N.Y. 14207		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE May 1983
		13. NUMBER OF PAGES 113
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		15. SECURITY CLASS. (of this report)
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Lorain Harbor Small-Boat Harbors		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report documents results of the study conducted to investigate the small-boat harbor needs at Lorain, Ohio. This report evaluates various alternatives considering benefits, cost, and social and environmental considerations (inprder) to develop a plan which warrants construction. in order		

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Syllabus

The Commander of the Buffalo Engineer District finds a need for the construction of a small-boat harbor at Lorain, Ohio.

The selected plan provides an all-weather recreational harbor with capacity for 600 slips. The structural features are an 800-foot detached breakwater and two entrance channels each 275 feet wide. The plan utilizes a portion of the diked disposal area and the existing protection of the commercial harbor. Because of the depths available, no dredging is anticipated.

Construction of the project is engineeringly and economically feasible with a benefit to cost ratio of 3.7. The first cost of construction is estimated to be \$3,500,000, of which \$1,750,000 would be the responsibility of the non-Federal sponsor (assumes traditional 50-50 cost sharing).

In addition to the \$1,750,000, the non-Federal sponsor would be required to invest an estimated \$5,550,000 to complete the docks, parking and necessary associated facilities. Including these associated costs the total first cost of the small-boat harbor would be \$9,050,000.

Development of small-boat harbor at this site is strongly supported by the non-Federal sponsor.

FINAL FEASIBILITY REPORT
LORAIN SMALL-BOAT HARBOR
VOLUME 2

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Introduction

This section introduces the reader to the Lorain Small-Boat Harbor Study and explains the content and organization of the report, along with providing the reader with some background on the study.

A map showing the city of Lorain and the Black River is shown as Figure 1 on the next page.

PURPOSE AND AUTHORITY

This report presents the results of an investigation of the recreational boating needs at Lorain Harbor.

In response to a resolution by the Committee on Public Works and Transportation of the House of Representatives, dated 23 September 1976, a reconnaissance study was initiated to review the needs of Lorain Harbor. The resolution is quoted below:

"Resolved by the Committee on Public Works and Transportation of the House of Representatives, United States, that the Board of Engineers for Rivers and Harbors is hereby requested to review the report on Lorain Harbor, Ohio, published in House Document No. 166, 86th Congress, 1st Session, and other pertinent reports, with view of determining whether any modifications to the recommendations contained therein is advisable at the present time, including consideration of the passage and safe navigation of new and larger ships operating on the Great Lakes."

This resolution is the authority under which this Feasibility Report was prepared.

SCOPE OF STUDY

The following water resource needs were identified during the reconnaissance phase of the study.

- a. Harbor modifications for commercial navigation;
- b. Additional marina facilities to serve existing and future demands for recreational small craft; and

c. Reduction of sedimentation on the Black River, and, thus, reduction in maintenance dredging and improved water quality.

This volume of the Feasibility Study concentrates on the needs of Recreational Navigation.

The needs of commercial navigation and the reduction of sedimentation on the Black River are addressed in separate volumes. The study on commercial navigation is contained in Volume 1 and the erosion and sedimentation is contained in Volume 3.

STUDY PARTICIPANTS AND COORDINATION

Participation in this study by other governmental and public entities was encouraged through correspondence, telephone calls, and personal visits. Additionally, three public workshops were held during preliminary study efforts. These meetings were attended by individuals representing commercial, social, environmental, recreational, governmental, and planning interests. Direct coordination was maintained throughout the study with many agencies including: Lorain Port Authority, city of Lorain, Ohio Department of Natural Resources, Ohio Historic Preservation Office, and U.S. Fish and Wildlife Service. A summary of pertinent coordination is discussed in PROBLEM IDENTIFICATION, Public Involvement. A more complete discussion of the coordination is contained in the EIS.

RELATED STUDIES

The studies for the Lorain Port Authority completed in 1978 and 1980 have recommended recreational boat moorings and/or berths in the water area inside the east breakwater and adjacent to the diked-disposal area. Their recommendations were based more upon preliminary planning than upon detailed or specific design of facilities.

On the following page is a list of previous reports on Lorain Harbor that specifically relate to the development of a small-boat harbor.

THE REPORT AND STUDY PROCESS

In the interest of clarity, this Final Feasibility Report has been arranged into a Main Report and four appendices. The Main Report is written to give both the technical reviewer and the general reader a clear understanding of the study, the study results, and the key conclusions and decisions reached. It includes a discussion of the resources and economy of the study area; the problems and needs; the alternatives considered; social and environmental implications of the alternatives; and feasible and economically justified improvements. The costs and benefits of the various alternatives, and the division of project responsibility between Federal and non-Federal in the selected plan are also presented in summary form. The report documents the recommendations of the District Engineer.

The EIS (colored pages) contains the results of the environmental studies and the effect the proposed plan will have on the human and natural environment.

RELATED REPORTS
Corps of Engineers Studies

Year of Report	Work Considered	Recommendation
1967-1968	Construction of small-boat harbor in West Harbor.	Favorable until met with public opposition.
1970	Construction of 58 acres confined dredged material disposal area off the East Breakwater Shorearm.	Favorable
1971	Reconnaissance Report for Lorain Harbor: commercial, recreational, and maritime.	Favorable
1980	Preliminary Feasibility Report, with emphasis on commercial navigation needs, for Lorain Harbor.	Continue into Final Feasibility Study.
1981	Preliminary Feasibility Report on Lorain Small-Boat Harbor.	Continue into Final Feasibility Study.

Studies by Others

Year of Report	Work Considered	Client	Results
1970	Construction of a small-boat harbor in connection with commercial docking area in the East Harbor.	Stanley Consultants for Lorain Port Authority	Identified need, but cost were prohibitive.
1978-1980	Construction of a phased small-boat harbor in the East Harbor Basin.	Stanley Consultants for Lorain Port Authority	Proposed Construction of an interim small-boat harbor in the East Basin.

The four appendices present supporting data and details covering the information of the Main Report. They are not part of the Main Report but are described here for general information. Appendix A is a technical report of the preliminary designs and cost estimates for Lorain Small-Boat Harbor. Appendix B is a technical report of the economic evaluation for small-boat navigation benefits. Appendix C is a compilation of environmental reports and pertinent correspondence. Appendix D is a technical report of the detailed coastal engineering done in the study.

The study process consisted of the following major steps: identify water resource problems and needs in the study area; inventory, forecast and analyze conditions related to the identified problems; develop alternatives and evaluate them; compare them; and then select a recommended plan. During the study this process was repeated three times. The first iteration concentrated on identifying, developing, and screening alternative sites. The second took the site selected and concentrated on developing alternatives to best utilize the site. The third iteration took the best plans developed during the second iteration and went into more detail to select the recommended plan.

NATIONAL POLICIES

The Water Resources Council's (WRC) Principles and Guidelines direct that Federally assisted water related land planning be directed to achieve National Economic Development (NED) as a National Objective. NED is to be achieved by increasing the value of the nation's output of goods and services. In addition to this National Objective, the President, in a message to Congress on 6 June 1978, directed that the national water policy should be improved by "requiring the explicit formulation and consideration of a primary nonstructural plan as one alternative, whenever structural water projects are planned: These national policies are followed throughout the report.

Problem Identification

The purpose of this section is to describe the water-related resource problems and needs, which are pertinent to this study. The section presents information on the existing physical, human, and biological environment, including the current demand for small-boat navigation and recreational fishing; presents the most likely future that would exist without the project; and presents the planning objectives developed for the study.

EXISTING CONDITIONS

Physical Resources

Location - The study area is along the south shore of Lake Erie in north-central Ohio at a location about 25 miles west of Cleveland in the city of Lorain, Lorain County, OH. The study site is predominated by an urban port environment with a variety of public and private structures arrayed along the lake shore and river banks. The study area is pictured in Figure 2 on the following page.

Climate - The climate of Lorain is humid and temperate and the region is characterized by large annual and daily temperature ranges, although the presence of Lake Erie tends to moderate the temperature. The average temperature in January is 27.7°F and in July is 72.9°F. The highest temperature recorded is 105°F and the lowest is -23°F.

Cold air masses come from Canada during the winter months, but are modified by the relatively warm waters of Lake Erie, resulting in cloudiness and frequent snow from November through March.

Precipitation is well distributed throughout the year with an annual average precipitation of 35 inches, of which about 17 inches occurs as rainfall during the growing season.

Lake Water Levels and Fluctuation - Water levels in Lake Erie vary from year to year and season to season within the 9,910-square mile area of Lake Erie. The long term average is +1.76 feet above Low Water Datum (LWD). Also because low levels have traditionally occurred during the winter and fluctuations at Lorain are not very severe, this was not considered as a constraint during the study.



Figure 2 - Photo of study area looking east toward the port of Lorain

Sediment Quality - Sediment testing in Lorain Harbor was conducted by the U. S. Environmental Protection Agency (USEPA) in 1975 and by the Buffalo District COE in November 1981.

Based on USEPA's 1975 and our 1981 testing, the top two feet of sediment in the Outer Harbor is probably unacceptable for open water disposal and would have to be confined.

All sites tested by the Buffalo District COE, inside the East Breakwater in 1981, indicate the sediments are highly polluted. Readers desiring more information on the condition of the sediment or it's impact on the project should refer to the EIS (Para. 3.1.7 and 3.1.8).

Water Quality - The U. S. Environmental Protection Agency (EPA) conducted numerous water quality surveys in the Black River Basin from 1972 to 1979. The data from these survey demonstrated the significant increase in stream temperature caused by the U. S. Steel-Lorain Works and highlighted the impact of the Elyria Sewage Treatment Plant (STP) and U. S. Steel discharges on dissolved oxygen levels in the lower river. Concentrations as low as 2 to 3 milligrams per liter were recorded despite a river flow of 168 cfs. Problems with ammonia, cyanide, and phenolics were also noted in the river. While the water quality of the river leaves something to be desired, it has not apparently significantly effected the recreational potential of the Outer Harbor and lake. The intrusion of lake water into the Black River which was demonstrated by the EPA study probably has offset most of these water quality problems in the Outer Harbor.

Air quality - Data for the city of Lorain and Lorain County, collected during 1980, indicated violations of air quality standards for total suspended particles.

No official air pollution alerts were called in Ohio in 1980.

Although the city of Lorain is still best characterized as an industrial city, the quality of the recreational experience along the shore line is not noticeably affected by a southerly breeze. In addition, the predominant winds are usually out of the west and this would isolate the shoreline from any inland air pollution.

Human Environment

Land Use - Land use patterns in Lorain reflect the industrial-commercial nature of this lake port community. The banks of the Black River and the lakefront at the entrance to the harbor are characterized by high intensity industrial and related transportation uses, commercial docking facilities, utility uses, and recreation use activities. There remains, however, a significant amount of vacant or unused land available for industrial development along the 3-mile navigation channel.

The Port Authority of Lorain is the local agency responsible for promoting the industrial development of these waterfront properties. The Authority holds leases on various industrial properties that have been newly developed

or expanded in recent years. The junction of the lake, river, and railroads has established the pattern of land use development for the remainder of the city of Lorain. In recent years, the city and local civic organizations have embarked on an ambitious program of renewal and restoration that employs the beneficial aspects of the rail-river transportation network, while minimizing the barrier effect these networks have upon "free movement" within the city.

Lorain County Planning Commission documents show that transportation-related land was predominate in the vicinity of the study area, with a 34.3 percent portion of land totals. Other significant uses include residential with 27.8 percent, public/quasi-public with 10 percent, and retail with 5.5 percent, (Jaycock, R., Lorain Harbormaster, Personal Communication, 23 July 1981). The Planning Commission believes that the proposed small-boat harbor and development of the diked disposal area would benefit the city of Lorain, and the boating population of Lorain County. Downtown redevelopment plans for Lorain prepared by the Planning Commission Office have shown, and recommended, such a development since 1978. Therefore, the project is compatible with the land use plans for the area.

A U. S. Coast Guard Station is located on the east shore of the Black River at river mile 0.5. The station is continuously manned providing navigation regulation enforcement and surveillance, rescue, assistance operations for water craft, and maintenance of harbor navigational aids.

Population - Lorain County experienced rapid growth between 1950 and 1960. In this period, the population grew from 148,200 to 217,500, a 47 percent increase. The rate of growth decreased during the next decade to 18 percent, an annual growth rate of 1.6 percent compared with an annual growth rate of 3.9 percent during the 1950's. The area experienced rising unemployment during the 1960's which slowed population growth. The era of rapid growth (i.e., the 1950's) was a time of industrial expansion in the area, and it is probable that future rapid increases in population will be contingent on increasing industrialization. According to the 1980 Census Report, the population of Lorain County increased 7 percent from 256,843 in 1970 to 274,909 in 1980.

The population of the city of Lorain has increased at a lower rate than that of Lorain County. During the 1960's, population of the city grew by 13 percent, compared with 18 percent for the county. However, the population of the city of Lorain decreased by 3.5 percent between 1970 and 1980 from 78,185 to 75,416.

This report is only concerned with population statistics on a county wide basis. The projections used were developed by the Ohio Department of Natural Resources and were used because it was felt that they were more representative of the study area.

Recreation - Lake-related leisure time activities are an important element in Lorain's recreational pursuits. Pleasure boating, fishing, swimming, walking, and running activities are commonly observed on or near the lake-shore. A shortage of fishing piers open to the public exists in the area.

As a result, a number of structures such as the dike disposal area and groins located in Century Park east of Lorain Harbor are being utilized by the general public. Residents also use privately owned and built seawalls for fishing. Most of these structures are also used by the public to observe harbor and lake activities, as well as for duck hunting.

During the Initial Public Meeting, city officials expressed a desire for improved access to the east breakwater and diked disposal area because of increased sportfishing (Figure 3).

Approximately 5,400 small boats were registered in Lorain County during the mid-1970's. The harbor includes two recreational boating marinas. One, owned by the city, is located between the city's Water Pollution Control Plant and the U. S. Coast Guard Station and has a berthing capacity for 70 boats (Figure 4). The other, privately owned, is located upriver adjacent to the Erie Sand and Gravel facility and below the N&W Railroad Bridge and has a berthing capacity of 23 boats. Due to the limited berthing capacity available at Lorain, trailering has been necessary.

The demand for recreational boating facilities is so great that the Lorain planning agencies, Lorain Port Authority, and private interests are seeking additional locations and financial aid to provide new facilities. A current plan of the city is to use the recently constructed diked disposal area and the east basin as part of a large recreational-marina complex after the anticipated 10-year fill-in period. This area could provide space for supporting a marina and additional boat-launching ramps. The Port Authority completed construction of a temporary rubber-tire floating breakwater (Figure 5 & 6) in the east basin of next to the disposal area in July of 1981. This will provide dockage for recreational craft until permanent facilities are constructed.

The city and county of Lorain maintain over 50 parks, several golf courses, lake-front facilities, neighborhood parks and play lots, swimming pools, and a variety of other recreational facilities. However, Lorain area recreational and open space availability is generally lower than standards proposed by the National Recreation and Park Association for a city of the size of Lorain. The planning standards, developed during the mid-1970's, indicate that the region lacks over 200 acres of leisure and open space.

Lakeview Park, immediately west of Lorain Harbor, has 1,300 feet of lake frontage and is used by approximately a third of a million people each summer. The city of Lorain considers the beach a nucleus for future park development and growth.

Employment and Income - The mean family income for Lorain County in 1978 was \$19,409. This level is a bit above the State's 1978 average of \$18,505 and is most likely a result of the urban-industrialized nature of the economy. Manufacturing plays a major role in Lorain's economy and in 1978, 40,997 people or 38.6 percent of the labor force was employed by the 55 diversified manufacturing industries in the area.



Figure 3 - Photo of diked disposal area showing fishermen parking along access road.



Figure 4 - Photo of Lorain Yacht harbor basin.



Figure 5 - Photo showing location of rubber tired breakwater.



Figure 6 - Photo of rubber tired breakwater.

Lorain Harbor, upon which the city of Lorain is economically dependent, handles large quantities of iron ore and limestone. It has a breakwater-protected outer harbor and an excellent inner harbor. The Black River, on which the port is located, is navigable by large ships for 3 miles upstream and serves major industries with easy water transport, dry dock, and shipyards. The harbor is used principally for the handling of bulk commodities.

Local Development - The Lorain Port Authority was created in 1964 to further Lorain's position as a world port. It has financed a \$7,000,000 dry-dock and related improvements for American Ship Building Company through an Industrial Revenue Bond issue. Allied Oil Company's construction of a \$5,000,000 terminal facility has added to Lorain's water transportation resources. In May of 1980, Republic Steel Corporation completed construction of a facility that accommodates 1,000-foot self-unloading bulk vessels, and expects to transship about 7.5 million tons in the next few years.

In addition to industrial expansion and improvement, Lorain has realized the importance of redevelopment in the downtown area and has begun an urban renewal project in a 17-acre site surrounding Lorain's new City Hall. Major retail, commercial, and housing facilities are included, along with a parking structure and civic center for its citizens. A large urban renewal project in south Lorain is another example of redevelopment in the downtown area including residential development and commercial expansion.

These projects have the cooperation of the Community Development Department which is working toward improving movement of traffic by synchronizing traffic lights and developing a mass transportation system. The city is also considering beach improvements, and is giving much more attention to the recreational potential of the harbor.

Transportation Facilities and Services - The city of Lorain has east-west transportation via highway, U. S. Route 6, and south on State Routes 57 and 58. The Lorain-Elyria metropolitan area is served by Interstate 90 and 80, connecting between Toledo and Cleveland. Interstate 71, which provides access to the north and south, is about 15 miles away. This excellent grid of highway was particularly important to the study because it makes Lorain very accessible to individuals outside Lorain County who might wish to use a small boat harbor at Lorain.

The city of Lorain is also serviced by three railroads, two small airports in Lorain County and Cleveland Hopkins International Airport which is only 20 miles from the Port of Lorain.

Water supply for the city of Lorain is obtained from Lake Erie. Mains which range from 4 to 24 inches serve the city from a water works located near downtown Lorain.

A study made by the City of Lorain Department of Public Services regarding the city's streets and emergency and public services including police, fire, ambulance, utilities, water, and sanitation, indicates that the existing streets and public services including the existing sewage treatment facility

can handle the expected potential influx of recreational boaters to the area and service a new marina facility.

Current Fleet - There are currently about 215 slips in Lorain. Appendix B contains a discussion of the current fleet. This is based on the Midwest Research Institute Study, Reach 3003, which was a study done for the International Joint Commission.

Cultural Resources - In order to assess the impacts of the proposed project on significant cultural resources, the 18 March 1980 edition of the National Register of Historic Places and all subsequent revisions were consulted. While several properties were listed for the city of Lorain, only one, the Lorain Lighthouse, is located close to the Environmental Impact Area of the proposed study. This structure would not sustain any direct impact from construction of an improvement resulting from this study. Based on a cultural resources report completed for the area in 1975 entitled: Inventory of Cultural Resources: Diked Disposal Site No. 7, Lorain Harbor, Ohio, by Dr. Don Dragoo, and correspondence with Regional Archaeological Preservation Office, Cleveland, dated 14 July 1981, there are no potentially significant sites which would be impacted by any of the project alternatives.

Fishery Resource - A moderately diverse fish community persists in Lorain Harbor in spite of rather limited physical habitat and degraded water quality. Within the last 10 years, 47 species of fish have been identified for the Outer Harbor. During the same period of time, 41 species of fish have been collected within the lower reaches of the Black River. Gizzard shad and emerald shiner dominate catches in both the Outer Harbor and lower river area. Freshwater drum, smelt, white bass, spottail shiner, trout-perch, and yellow perch are also common in the Outer Harbor. Trout-perch are also very common in the lower river along with carp, brown bullhead, and white sucker. Sport fishing is almost completely confined to the Outer Harbor area. The most common game fish caught are yellow perch, smallmouth bass, and channel catfish. Spawning and nursery habitat for fish are almost nonexistent in the lower river area, and in the Outer Harbor the habitat is severely limited because of deep navigation channel depths.

Very little specific information could be found on the fish community in the vicinity of the mouth of Beaver Creek. The creek is located west of Lorain Harbor and has been modified to accommodate a large marina. Nineteen species of fish have been collected at sites in the middle and upper portions of the Beaver Creek drainage basin. Many of these species, including bullheads, sunfishes, largemouth bass, and white crappie would be expected to be found in the lower portion of Beaver Creek. Species such as walleye and northern pike would be expected to move in and out of Beaver Creek at certain times of the year. The open-lake habitat, base-gradient stream habitat, and wetland habitat found in the vicinity of the mouth of Beaver Creek is similar to that found in Lorain Harbor and it is expected that the respective fish communities would be quite similar.

Wildlife Resources - Wildlife observed in Lorain Harbor was concentrated in the 21st Street wetland and the river area upstream of the Upper Turning Basin. The persistent emergent cover in the wetland provides shelter for

small mammals such as eastern cottontail, shrews, mice, and voles. Numerous muskrat and raccoon tracks were observed during late fall in the areas where broad-leaved emergents are withered and matted in mud flats. A snapping turtle was also observed in the wetland.

Lorain Harbor is located on the eastern edge of the Mississippi flyway and on the western edge of the Atlantic flyway, thus attracting large numbers of ducks, geese, and swans which pass through the area on migratory flights between southern wintering grounds and northern breeding grounds. The Outer Harbor provides good feeding habitat for many species of diving ducks including mergansers and scaup. These ducks are primarily attracted to the abundant food source of gizzard shad and emerald shiners. The only abundant dabbling duck is the mallard. Herring gulls, ring-billed gulls, and Bonaparte's gulls are also attracted to the Outer Harbor. The gulls generally outnumber all other water birds in the harbor area. No significant amounts of waterfowl breeding occur in either the Outer Harbor or the lower reaches of the Black River.

The area around the mouth of Beaver Creek receives very little water bird use relative to that found in and around the Lorain Outer Harbor. The limited number of water birds generally seen near Beaver Creek consist primarily of mergansers.

The proposed project lies within the range of a Federally listed endangered species, the Indiana bat (Myotis sodalis). The study area was inspected by a biologist of the U. S. Fish and Wildlife Service and it was determined that no suitable habitat for endangered species existed. Coordination with the Ohio Department of Natural Resources has revealed no State-listed, threatened, or endangered species, or critical habitat within the study area.

FUTURE WITHOUT PROJECT

Population, Employment, and Income - The population, employment, and income projections for the city of Lorain and Lorain County behave independent of any impacts from a proposed small-boat harbor. Population is expected to grow in Lorain County from 274,909 in 1980 to 407,000 in 2040.

Local Development - It is expected that the city of Lorain will initiate some development for recreational boating without a Federal project. They have constructed a floating tire breakwater and a marina with mooring bouys for 36 boats in the eastern basin of the Outer Harbor. This is a short term project and not expected to increase much beyond it's current size. It is also expected that they will rehabilitate an existing boat launch facility at the municipal pier in the western basin of the Outer Harbor at or near the the area we considered as a nonstructural alternative (Note: City filed for Corps permit during January 1983 to construct boat launching ramp at site). This site is discussed in the plan formulation section of this report.

Recreational Demand - Current demand for recreational boating far exceeds the slips and facilities available. Boating and fishing facilities are at capacity according to the Lorain Port Authority. In addition most of the lake front property is fully developed. The city of Lorain is interested in

relieving some of this stress, but apparently lacks sufficient funding abilities to undertake any but temporary measures to create any increased small-boat moorings (i.e., the floating breakwater described previously).

Significant expansion of existing marinas at Lorain is restricted by either land and water ownership conflicts or by physical limitations. Marinas within Lorain Harbor, notably the Lorain Yacht Basin and Seaway Marina, have fully utilized available land and water areas. Acquisition of adjacent areas is unrealistic due to commercial valuations or public facility uses (sewage treatment plant, U. S. Coast Guard Station, industrial development, and commercial ship channel). To the west of the harbor, marinas on Beaver Creek have some areas available for expansion, but these areas are inland and require water access under a railroad bridge and a highway bridge with vertical clearances of about 5 feet. Therefore, the type of vessels using these facilities generally is limited to trailerable power boats. Also, major expenditures are required before this area has an all-weather entrance.

Without Federal cooperation, conditions will remain essentially unchanged from current conditions. Marine-related businesses and small-boat industries will not grow appreciably. Local and regional recreational use of Lake Erie will not increase to fuller resource potential.

Individuals will pursue nonwater related recreation or will experience objectionable crowding conditions. Boaters will purchase small trailerable boats even if larger nontrailerable boats are preferred. Still, convenience of launching will limit this activity.

Regional boating and fishing facilities will not accommodate demand transfer from Lorain, since these facilities also will experience capacity usage. In general, an opportunity for appropriate and desirable recreational use of Lake Erie at Lorain, OH, may be missed.

In deriving projections of future recreational boat user-demand, a statistical model was developed based on county boat ownership registration correlated with various socioeconomic characteristics including population, income, ethnicity, and travel distance. The State boat registration files provided the county of registration, the principal lake user area, and the type and size of the craft. The user-demand was projected to the year 2040 in 10-year intervals. The projected demand is based on current demand considerations. Potential recreational facility needs in Lorain were determined by summing the capacities of existing facilities and then subtracting from the projected demand.

Based on median value facility demand projections, the total facility need at Lorain is estimated to exceed 600 slips by the year 1990. Projection of future fleet mix by type and size of craft is based on regional boat fleet mix. These percentages were applied to the demand projections. The future fleet mix by size of craft is presented in Appendix B.

The analysis also indicates that an appreciable demand exists for additional transient berths and launching facilities. Currently, two boat slips at city of Lorain facilities are used for daily transient demand. State boater

registration statistics indicate that 90 percent of all boats under 16 feet are trailered, and that 44 percent of all registered boats are under 16 feet. Our analyses assumed all boats under 16 feet are trailer drawn.

Recreational Fishing - Land-based fishing demand is estimated using the capacity method. This method is appropriate when the participation rate for a given activity is determined by the facility supply rather than the total demand levels. This condition was confirmed by projecting potential usage based on Lorain County population growth.

The future potential usage was extrapolated from the historic correlations between population and fishing licenses sold within the same area, and between fishing licenses sold and annual fisher-days. Further explanation of this analysis is contained in Appendix B. The land-based fishing facilities at Lorain Harbor in 1975-1977 only satisfied 50 percent of potential demand. The city plans to provide facilities at the diked disposal area that would increase supply by 85 percent; however, the potential demand would continue to grow with the population. The estimated supply satisfies only 49 percent of the demand expected in the year 1990. Beyond 1990 the percentage of satisfied demand decreases as populations grows and facilities remain constant.

PROBLEMS, NEEDS, AND OPPORTUNITIES

Recreational Boating - In its current condition, Lorain Harbor offers very little in recreational facilities for boaters who desire to use Lake Erie. The existing facilities consist of two relatively small marinas. One owned by the city, located near the mouth of the Black River, has a capacity for 70 boats. The other, privately owned, is located upriver across from American Steamship and has a capacity for only 23 boats.

The existing demand for additional permanent facilities is so great, that the Lorain Port Authority has recently constructed (August 1981) a temporary 600-foot floating tire breakwater (Figures Page 12) in the East Basin of Lorain's Outer Harbor. The breakwater project provided temporary single-point moorage space for about 36 small crafts. The floating breakwater project is expected to last 6 to 10 years.

The Port Authority of Lorain is extremely interested in an expanded small-boat harbor capacity. The Corps of Engineers has previously (1968) developed recommendations for a new small-boat harbor in the west basin at the foot of Brownell Avenue, but that improvement plan was discontinued from further investigation because of local opposition to project siting in the West Basin. Currently, local citizens interest groups, and institutions complain of immediate need for additional mooring locations. At the initial public workshop for this study on 5 November 1980, local boaters, fishermen, marina and marine supply proprietors, public officials, and citizens expressed their desires for a small-boat harbor at Lorain and requested that construction of this project be undertaken at the earliest possible date. These factors indicate a need for enlarged small-boat harbor capacity at Lorain, OH.

Public Safety - Lorain Harbor can currently function as a small-boat harbor-of-refuge. However, boats seeking to escape dangerous lake conditions are inconvenienced by unavailability of appropriate docking space, conflicts with commercial ship traffic, and vertical clearance limitations at the Erie Avenue Bridge. A new small-boat harbor could eliminate much of this functional inconvenience, and could improve the comfort and safety offered to boaters seeking refuge.

Recreational Fishing - As a result of comments at the initial public workshops and interviews with the Lorain Harbor master and president of a local fishing club, interest in land-based fishing improvements at Lorain was well substantiated. The 1979 creel census, Ohio Department of Natural Resources, has shown the most utilized shore facilities on Ohio's Lake Erie shore to be at Cleveland and Lorain.

Public Involvement - Participation in this study by other Governmental and public entities was encouraged through correspondence, telephone conversations, and personal visits. In addition, three public workshops were held during the Preliminary Feasibility Study efforts. These meetings were attended by individuals representing commercial, social, environmental, recreational, governmental, and planning interests. Minutes of the meetings are contained in Appendix C.

An orientation workshop was held at Lorain City Council Chambers on 5 November 1980. The purpose of the workshop was to describe the study process; obtain public views on potential small-boat harbor sites; and obtain input relevant to recreational boating demands and resources. Mr. John Sulpizio of the Lorain Port Authority made substantive remarks regarding city plans for a floating breakwater marina near the East Breakwater (completed in 1981). He and others were interested in possible marina sites to the east of the Diked Disposal Area. Other siting recommendations included Beaver Creek, berthing within the Diked Disposal Area, and restudying the West Breakwater site. All, except the altered use of the Diked Disposal Area, were accepted into the study.

Most participants agreed that a significant shortage of available berthing capacity, especially for sailboats, exists at Lorain. The U.S. Coast Guard expressed concern for more staffing as boating activity increases. In general, there appeared to be a very positive local response toward the need for a small-boat harbor at Lorain. However, opinions varied as to proper site and size of harbor.

A second Workshop was conducted at Lorain City Council Chambers on 10 December 1980. At this meeting, evaluations and tentative conclusions pertaining to site selection were presented. Comparative evaluation of each site's response to major engineering, economic, environmental, and social factors were presented.

A third workshop was held at Lorain City Council Chambers on 10 September 1981, to display and compare harbor design concepts and select alternative plans for further study.

PLANNING OBJECTIVES

Problem and Opportunity Statements - Based on the previous sections the following planning objectives were developed. Each objective is for the 1990-2040 planning period.

(1) To increase mooring facilities for shallow draft recreational crafts at Lorain Harbor.

(2) To improve Lorain Harbor as a harbor-of-refuge for light draft recreational craft.

(3) To increase the quantity of sites available for land based fishings at Lorain Harbor.

(4) To preserve cultural resources in Lorain Harbor which would contribute toward protecting a part of the heritage of Lorain County.

(5) To preserve, protect or enhance the quality of fish and wildlife where possible in Lorain Harbor.

(6) To provide safe trafficking for the mix of commercial and recreational boats using Lorain Harbor.

Planning Constraints - During this Final Feasibility study, planning constraints were identified concerning site location, berthing capacity, environmental aspects, and commercial conflicts. Each constraint is described in subsequent paragraphs.

(1) Site Location - The authority for this study specifically focuses upon Lorain Harbor, which is administered by the city of Lorain and is wholly within city limits. As a result, siting efforts were focused upon the port and its nearby vicinity. The study area generally was confined within city limits since the city of Lorain has identified itself as an interested, non-Federal sponsor. Citizen remarks at the Orientation Workshop were responsible for extending the westerly limit past the initially proposed 2-mile distance from the Black River mouth. This has accommodated local desire to include the Beaver Creek location into the study area.

(2) Berthing Capacity - Harbor siting evaluations were based upon a minimum berthing capacity of 400 slips. Upon selection of the most advantageous site, alternative harbor layouts were designed for capacities of both 300 and 600 slips. These sizes were initially selected because propitious harbor sites seemingly accommodate these capacities.

(3) Environmental Concerns - The desire to protect valuable wetlands from unnecessary destruction is emphasized by a variety of laws and guidelines. A planning constraint which insures compliance with appropriate wetland protection stipulations is iterated in response to the over public concern for these unique wildlife areas.

(4) Commercial Conflicts - Recreational harbor improvements are constrained from severely conflicting with existing or planned commercial uses of Lorain Harbor. The desire to promote viable commercial uses in priority over recreational uses is indicated by the Lorain Port Authority. Notably, the Riverside Park Cut commercial channel alternative must receive consideration when studying potential recreational harbor alternatives within the port boundaries. This cut places the main channel at or near a water site (east basin of Outer Harbor) which the Lorain Port Authority has selected for interim development as a small-boat mooring basin.

Formulating a Plan

The objective of this section is to develop plans for satisfying the recreational boating needs at Lorain Harbor and to select the plan that best fulfills the objectives stated in the previous section. To do this, we used an iterative procedure consisting of three iterations. They were:

- (1) Examine alternative sites,
- (2) Using best site from one, develop several schemes for utilizing the site, and
- (3) Take the best schemes from two and develop detailed design information to select the final plan.

EVALUATION CRITERIA

Plans must be formulated to meet the needs of the area with due regard to benefits and costs, both tangible and intangible, and effects on the ecology and social well-being of the community.

Within the overall planning framework are other more specific criteria relative to policies, technical engineering, economic principles, social and environmental values, and local conditions. These criteria, noted as "Technical," "Economic," and "Socioeconomic and Environmental" are discussed below.

Technical

The deep-water wave heights and lake levels used to compute structure crest elevations and wave height criteria in the Inner Harbor were based on the recreational boating season which is assumed to extend from April through December. In computing the maximum wave heights and lake levels to insure structural stability of the project, an annual design event was selected. In any case, a 200-year design frequency was selected using a 20-year significant wave height and a 10-year lake level for each design event.

Economic Criteria

- (1) Tangible benefits should exceed project economic costs.

- (2) Each separable unit of improvement or purpose should provide benefits at least equal to its cost unless justifiable on a noneconomic basis.
- (3) Each plan, as ultimately formulated, should provide the maximum net benefits possible within the formulation framework.
- (4) The benefits and costs should be in comparable economic terms to the fullest extent possible.
- (5) A 50-year economic life and 7-7/8 percent discount rate are used for the economic evaluation.
- (6) The base case for comparison of alternatives plans is the condition that is expected to exist without any Federal action.

Socioeconomic and Environmental Criteria

The criteria for socioeconomic and environmental consideration in water resource planning are prescribed by Section 102 of the National Environmental Policy Act of 1969 (PL 91-190) and Section 122 of the River and Harbor Act of 1970 (PL 91-611). These criteria prescribe that all significant adverse and beneficial economic, social, and environmental effects of planned developments be considered and evaluated during plan formulation. In addition, Executive Order 11990, dated 24 May 1977, directs that each agency shall provide leadership and take action to minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. Executive Order 11988, Flood Plain Management, discourages Federal agencies from undertaking projects in a flood plain or that would encourage development in a flood plain.

ITERATION 1 - DEVELOPMENT OF ALTERNATIVE SITES

Potential sites were identified from maps, photographs, and visual reconnaissance. Equally important methods of identifying potential sites involved interviews and information obtained at the orientation workshop. Also, during this iteration, we examined possible sites that would lend themselves to nonstructural development. We further defined nonstructural as any site that could be developed with a minimal amount of construction in the water.

A total of six potential small-boat harbor sites were identified during this phase of the preliminary planning. The six sites varied in location and characteristics. General site locations included the Black River (Inner Harbor), the East and West Basins of the Outer Harbor, the open coast, and a stream mouth remote from the commercial harbor (Beaver Creek). This latter location was added as a direct result of comments at the Orientation Workshop; even though, the original study limits required expansion to include this type of geographical environment. The nonstructural alternative is Site 6, located on lands adjacent to the Municipal Pier in the West Basin.

Sites were compared by developing a single harbor layout for each site. Then, the characteristics of each site plan were assessed in terms of its

ability to satisfy planning objectives and evaluation criteria. A brief description of the alternative sites investigated is presented in the following paragraphs. All costs are on December 1981 price levels. Both the cost and benefit data are considered adequate to identify the site that warrants further consideration.

Alternative Site No. 1 - Inside East Breakwater. The plan for this alternative site features a breakwater 900 feet long, a water area of 38 acres, a land area of 23 acres, and a berthing capacity for 600 boats (see Plate 1). Federal costs for construction are estimated to be \$1.0 million, and non-Federal costs to be \$5.0 million. Principal advantages for this site are derived from the existing water conditions and depths, planned uses of adjacent lands, and the proximity of major street systems. The principal disadvantages are the possible conflict with commercial port improvements presented in the Commercial Navigation Study for Lorain Harbor, and the presence of a water pollution control facility on adjacent lands to the west.

No major environmental problems are anticipated.

Alternative Site No. 2 - East of Diked Disposal Area. The plan at this site (Plate 2), like that of Site No. 1, makes use of future lands created by the diked disposal area. It features two shore-connected breakwaters measuring 1,900 feet and 700 feet in length, and enough water area for 600 slips. Total construction costs are approximated as \$4.4 million Federal share and \$10.4 million non-Federal share. As in Alternative Site No. 1, this site plan has advantages by complimenting the city's plan for an adjacent park, and by having easy access to the city's major streets. It will also provide relief from erosion of the adjoining shoreline.

The location of Alternative Site No. 2 completely outside of existing harbor boundaries does prevent conflicts between recreational and commercial facilities. However, since there is no barrier between the open-lake waters and the small-boat harbor breakwaters, costs are greatly escalated by the relatively massive protection requirements. Also, water depths are greater and breakwaters are comparatively lengthy. Excessive cost is the singular, significant disadvantage of this site.

No major environmental problems seem likely.

Alternative Site No. 3 - Inside West Breakwater. The plan at this site features a 15-acre land area and a 30-acre water area with capacity for approximately 425 berths (Plate 3). Both the land and water areas have irregular shapes in order to avoid adjacent commercial uses. Major structural elements of this plan include elevation of the west breakwater to prevent wave overtopping, and construction of a bulkhead along the northern edge. Nearly the entire berthing area is dredged, with disposal occurring behind the new bulkhead to raise land areas there. Cost estimates

for the site are \$1.5 million Federal and \$7.0 million non-Federal. Non-Federal costs are increased by basin dredging and land acquisition requirements. Land purchases must occur along a power generating site and within a residential area. Local opposition to construction of a small-boat harbor at this site previously caused the Corps to discontinue an authorized small-boat harbor study at this location.

Other disadvantages are the inefficient orientation of land and water areas, poor access to roads, and interference with commercial operations, most notably the infringement upon lands used by a power generating company.

Alternative Site No. 4 - Black River at 21st Street. The plan for this site includes a single breakwater of 1,500-foot length, a 20-acre water area for approximately 400 boat slips, and a 20-acre land area (Plate 4). The water area, characterized as a wetland, must be dredged to project depths. The adjacent commercial channel must be widened into the opposite river bank. Construction costs are estimated to be \$5.1 million Federal and \$11.7 million non-Federal. These high costs are largely associated with breakwater construction and dredging.

This site is relatively close to major highways and streets. However, access to land facilities is hampered by surrounding high bluffs. Steep road grades are considered as a detriment, especially for boat trailering. The water access route to Lake Erie traverses a lengthy portion of Inner Harbor commercial channels and passes under the bascule bridge at Erie Avenue. Additional water use conflicts are created by the boat basin's infringement upon an existing turning basin, although this is mitigated by channel widening into the opposite riverbank.

The destruction of wetlands is considered a serious environmental impact with possible mitigation measures. Also, surrounding commercial and industrial land uses detract from the aesthetics of this site.

Alternative Site No. 5 - Beaver Creek. Within the city limits of Lorain, this site has the unique shoreline characteristics of a low-lying area and a creek which is remote from the Black River. These characteristics have induced private development of marina facilities along Beaver Creek. The potential enlargement of these capabilities at or near this site is investigated as a solution.

Unfortunately, major railroad and highway bridges with limited vertical clearance over the water (about 4 feet) preclude advantageous use of low-lying areas landward of the crossings. Sufficient water areas lakeward are attainable only by constructing large protective structures in Lake Erie (see Plate 5). Therefore, the plan at this site features a 2,900-foot shore-connected breakwater, a 1,200-foot riprap wall, bulkheading of land facility areas, and dredging to create a 600-boat marina (33 water acres and 18 land acres). The cost of this development is about \$5.1 million Federal and \$14.8 million non-Federal. These costs include land acquisition.

First costs seem to outweigh advantages of eliminating conflicts with commercial navigation and convenience to major highways. In fact, safe land access is detrimentally affected by the necessity of a railroad crossing between the highway and parking facilities.

The projection of a breakwater far lakeward of surrounding land forms is likely to cause erosional problems at adjacent shores and adversely affect railroad uses there. Sedimentation is possible within the boat basin since the creek empties into quite harbor waters.

Even though existing land uses include private marinas, the natural habitat areas are relatively valuable and some are characterized as wetlands or transition zones. The nearshore environment also is relatively productive and natural and disruption could cause serious environmental problems.

Alternative Site No. 6 - Nonstructural. A nonstructural alternative is defined in this study as one requiring no new construction activities within water areas, yet differs from "no-action" by implementing some means of increasing boating storage and launching capabilities.

The nonstructural alternative encompasses a new dry-storage boat facility at the existing Municipal Pier launch ramps (see Plate 6) in conjunction with preferential use by large motor boats and sailboats of the existing public yacht basin at the Black River mouth. The new dry-storage facility is located on public land areas and is envisioned as including a modern, automated type launching apparatus within an enclosed building containing stacked motor boats up to lengths of around 22 feet. Total dry-storage capacity for 400 boats is provided at a total cost of about \$2.0 million, with no Federal cost sharing.

The principal advantage of this site is the very low implementation cost. The disadvantages include limits on the fleet mix which can be accommodated, delays for launching during peak periods, potential problems when inclement weather causes a convergence upon the facility, and land encroachment problems from both commercial uses and recreational fishing.

Comparison of Alternative Sites

Method - The six alternative sites are compared for purposes of selecting the superior small-boat harbor location at Lorain. Comparisons are made in terms of engineering, economic, environmental, and social characteristics exhibited by each alternative. As described earlier in this report, the selected site will be analyzed further during the next iteration.

Public opinion and input on the various site characteristics was invited at the Interim Public Workshop. At this workshop, site descriptions and planning analyses were presented along with tentative site selection conclusions. Active interaction with workshop participants was recorded, and pertinent comments were used to aid site comparison efforts.

Table 1 illustrates the type of comparisons that were made. Sites were scored from +2 to -2 depending on their relative performance. In some cases, such as maximum net benefits plan, the score was either all or nothing. A score of +2 is considered the best score, with a -2 being the worst.

Table 1 - Site Comparisons

Criteria	Plans					
	1	2	3	4	5	6
	Inside East	Outside East	Inside West	Outside River	Beaver Creek	Non- structural
Net Benefits	+2	-2	0	-2	-2	+2
All-Weather Access	+2	-1	2	1	0	+1
Conflicts with Comm.	+1	+2	+1	0	+2	+1
Development of Adjacent Land	+2	+1	+1	-1	0	+1
Sedimentation	+2	+2	+2	+1	-1	+2
Erosion	0	+2	0	0	-2	0
Environmental Impacts	-1	-1	-1	-2	-2	0
Social Impacts	+1	+1	0	0	0	0
Land Fishing	<u>2</u>	<u>2</u>	<u>2</u>	<u>0</u>	<u>1</u>	<u>-2</u>
TOTAL	+11	+6	+7	-3	-4	+5

Results - The Inside East Breakwater site possesses overall superiority and excellent potential for implementation. This site exhibits responsiveness to all evaluation criteria, and showed net benefits higher than any other structural plan. Construction costs for both Federal and non-Federal interests were lower than any of the other structural alternatives costs. Local support for this site is evident from city and Port Authority decisions to create an "interim" temporary marina there.

In summary, the Inside East Breakwater site provides an opportunity to utilize an advantageous water area (existing depths, wave protection, and shoreline armoring are favorable), to enhance a future recreational park without encumbering social or environmental conflicts. No other site encompasses these important planning considerations without incurring substantially higher construction costs. Therefore, Site 1 in the East Basin was selected as the preferred site for further study in response to the recreational boating needs in the Lorain, OH, area.

ITERATION 2 - DEVELOPMENT OF SELECTED SITE

A range of preliminary plans with a variety of physical capacities were formulated to best develop the eastern basin site. Two plans accommodated a possible commercial channel realignment, the Riverside Park Cut. This section provides a summary of the engineering design, economic evaluation, and environmental assessment of the five preliminary small-boat harbor plans to develop the Inside East Breakwater site. The alternatives are:

- (1) 300 slips without Riverside Park Cut
- (2) 600 slips without Riverside Park Cut
- (3) 300 slips with Riverside Park Cut
- (4) 600 slips (300 wet + 300 dry) with Riverside Park Cut
- (5) 600 slips (detached breakwater) without Riverside Park Cut

Standard Features of Preliminary Alternative Plans

Certain features of the different small-boat harbor plans are common to all. These features are presented below to minimize repetitiveness in plan descriptions.

Entrance and Interior Channels - The entrance channel for each alternative is designed for depths of 8 feet below Low Water Datum (LWD = 568.6 IGLD-1955) and widths of at least 125 feet, exceeding the minimum allowable by 25 feet. These dimensions are selected to provide safe navigation for the projected fleet and to provide two-way boat traffic within the channel. Protective breakwaters are designed to limit waves at the entrance to 3-foot heights.

The interior channels and mooring basin are designed for a depth of 6 feet (below Low Water Datum) and minimum width of 100 feet. Wave heights in these channels are limited to 1 foot.

Breakwaters - All breakwaters exhibit a two-layer design, with a bedding and core of smaller rock overlain by armor stone. Side slopes are 1V:1.5H. The breakwater designs consider wave sources from: (1) wind waves, (2) wave overtopping of outer breakwaters, (3) deep water waves diffracted at the Outer Harbor entrance, (4) ship generated waves, and (5) reflected waves. This is discussed in more detail in Appendix D.

Mooring Basins - As described in the planning constraints section, basin design capacities of 300 and 600 slips were selected to evaluate the preliminary plans.

The site selected for additional study (Site 1 - Inside East Breakwater) has sufficient depth without dredging to accommodate more than 600 slips. Also, the breakwater lengths required to complete the containment and protection of the mooring basin do not appreciably change as the basin's area increases.

So, although we had targeted at a development of 300 to 600 slips at this site we were able to provide for more than 600 with very little additional cost.

Service Facilities - A public dock and service facilities are incorporated into each plan. The boat launching ramps provided for the plans are three lanes wide and access an interior channel.

In addition, restrooms, parking, utilities, and administration building are provided.

Land Ownership - All land and water areas for each alternative plan and construction access are publicly owned and administered by either of the offices of the city of Lorain, or the State of Ohio. Access improvements to the site will occur as part of other city projects, including park development on the diked disposal area. The diked disposal area is expected to be filled in about 10 years and should expect the type of loading a marina requires. The land can be accessed via Colorado Avenue.

Alternative Descriptions

Plan 1 - 300 Slips without Riverside Park Cut - Plan 1 would provide an all-weather small-boat harbor with a 300-slip capacity, but would preclude a commercial channel realignment through Riverside Park. The layout and project features for Plan 1 are shown in Plate 7. It features a 900-foot East Breakwater perpendicular to the diked disposal area, and a 200-foot West Breakwater from the opposite shoreline and lakeward of the East Breakwater. Each would have a crest height of 9 feet (LWD). Land support facilities are located on the, as yet, unfilled diked disposal area. This includes a total of 10 acres for parking, restrooms, and administration building. Vehicular access to the parking area is via Colorado Avenue.

No dredging is anticipated for project construction since existing depths are 14 to 6 feet below LWD. No major treatment of existing shorelines is expected. The easterly and westerly shores are protected by steel sheet-piling. The southerly shore is a "natural" sand beach which is further stabilized by the new East Breakwater. The rubblemound breakwater and beach are likely to attenuate energy reverberations within the basin.

Land-based recreational fishing facilities would include a 4-foot wide concrete cap and handrail on top of both breakwaters. A rock width of about 2 feet would flank each side of the walkway. This would induce safe and convenient fishing opportunities.

Plan 2 - 600 Slips without Riverside Park Cut - Plan 2 would provide an all-weather small-boat harbor with at least a 600-slip capacity, but would encroach into the possible commercial channel realignment through Riverside Park. Plate 8 displays the harbor layout and project features for Plan 2. It features a single rubblemound breakwater, 1,150 feet long with a crest height of 10 feet above LWD and protects a water area of about 40 acres. The 300-foot wide entrance channel opens onto the existing commercial channel at a location just outside the Inner Harbor. This could aggravate vessel traffic congestion.

Plan 3 - 300 Slips with Riverside Park Cut - Plan 3 would provide a 300-slip small-boat harbor with all-weather capability. This harbor concept would allow the commercial channel cut through Riverside Park. Plate 9 displays the layout of Plan 3. It features a 1,500-foot West Breakwater and a 500-foot breakwater with crest heights of 10 feet above LWD. A mooring basin of about 18-acre size results from this breakwater configuration. An entrance channel opens onto the commercial channel and is 125 feet wide. The main interior channel also is 125 feet wide until it parallels the southerly shore. Then the channel narrows to 100 feet wide and joins a 250-foot wide boat launching area. As in Plan 2, the commercial channel is about 500 feet wide at its juncture with the marina entrance.

Plan 3 utilizes all noncommercial water areas adjacent to the diked disposal area. Land support facilities are located on the adjacent portions of the diked disposal area.

Land-based recreational fishing facilities (concrete cap and handrail) would be provided on the 500-foot north breakwater. The West Breakwater would not include fishing facilities because it is located far from the parking areas, has excessive length, and is in an area of historically poor fishing success.

Plan 4 - 600 Slips with Riverside Park Cut - Plan 4 is identical to Plan 3 except a dry-storage facility has been added to insure capacity for at least 600 boats. The dry-storage facility is conceptualized as providing for 300 power boats with lengths about 22 feet or less. The facility would include a covered storage building, integrated hoist system, public dock, and parking (see Plate 10).

All other features remain similar to Plan 3, including provision for the Riverside Park Cut and recreational fishing.

Plan 5 - 600 Slips (Detached Breakwater) - Plan 5 would provide an all-weather recreational harbor with a 600-slip capacity and would conflict with the possible commercial channel realignment through Riverside Park. The layout of Plan 5 is shown in Plate 11.

Plan 5 essentially is an alteration of Plan 2, except the detached breakwater concept allows a separation of recreational and commercial traffic at the marina entrance. A 200-foot wide waterway between the easterly end of the detached breakwater and the westerly end of the main breakwater provides this separated entrance. This reorientation of breakwaters (relative to Plan 2) reduces the water area for mooring and interior channels, but still maintains sufficient size for 600 slips and all access channels. All other features, land and water, are similar to Plan 2, including an alternate entrance directly connected to the existing commercial channel.

Recreational fishing is limited to the 800-foot main breakwater which is connected to the diked disposal area. Plan 5 also features an 8-foot wide breakwater crest where fishing walkways are provided.

Plan 6 - Nonstructural is the nonstructural site described under Iteration 2. This alternative was used because it was felt that this

sented more potential than trying to develop an additional one at a site we had chosen for structural development.

Comparison of Plans

The six plans are compared as to their success in fulfilling the planning objectives. The impact of the plans is measured by comparing their consequences on the four accounts: Other Social Effects, National Economic Development, Regional Development, and Environmental Quality when compared to what is expected to exist if no Federal small-boat harbor is constructed.

For the purpose of illustration, the comparisons are shown on the following page. The plans are generally compared as in Iteration 1 by rating them between +2 and -2 with a +2 being the best rating. Plans receiving a positive score are considered to present a better condition than the assumed without condition. It is important to note that Plans 3 and 4 were formulated in case the without project condition included the Riverside Cut relocation of the commercial navigation up the Black River. Since we now know that is not a viable alternative, we compared all plans in Table 2 against the same without condition - no Riverside Cut.

Also, the without condition includes a part of Plan 6, as we anticipate the locals will construct a portion of the nonstructural improvements whether or not a Federal Small-boat harbor is built.

Trade-off Analysis

Of the structural plans, two could provide at least 300 slips and three would provide at least 600 slips. All five structural plans would encompass a three-lane launch facility for trailered boats and would enhance breakwater fishing opportunities.

The five structural alternatives vary in costs, benefits, size, and function. One common feature is the avoidance of large, adverse impacts upon the physical or social environment.

Plans 3 and 4 differ from other structural alternatives primarily because provisions are made to accommodate a possible commercial channel cut through Riverside Park. This cut was under consideration for the commercial navigation study, while these preliminary plans were being developed. Based on a more detailed analysis of the Park Cut in the commercial navigation study, this feature has proved to be economically unjustified. Therefore, any alternatives in the small-boat harbor study which made allowances for this feature no longer warrant consideration.

Plans 1, 2, and 5 are generally more responsive to the planning objectives because they were formulated assuming the new commercial alignment would not occur. Plan 1 is designed to berth 300 boats, while Plans 2 and 5 are assured of having capacity for 600 boats. Plans 1 and 2 each provide about 1,150 feet of breakwater for land-based fishing. Plan 5 has 800 feet of breakwater fishing. Of these three plans, Plan 1 is estimated to be the

Table 2 - Comparison of Plans

Descriptions	Plan Numbers					
	1	2	3	4	5	6
	300-w/o	600-w/o	300-w	600-w	600-Det.	Non-structural
<u>Planning Objectives</u>						
Increased Moorings	+1	+2	+1	+1	+2	0
Harbor-of-Refuge	+1	+2	+1	+1	+2	0
Land-Based Fishing	+2	+2	+1	+1	+1	-1
Preserve Cultural	0	0	0	0	0	0
Fish and Wildlife	0	0	0	0	0	0
Conflict Commercial - Recreational	0	-1	0	0	0	0
<u>National Accounts (3)</u>						
OSE	+1	+2	+1	+2	+2	0
NED (1)	204	505	21	364	421	450
RED	+1	+2	+1	+1	+2	
EQ	0	0	0	0	0	0
<u>Specific Criteria</u>						
Project Cost (1, 2)	2,278	2,929	4,046	4,101	3,627	3,000
Federal Share	1,064	1,328	1,948	1,948	1,712	0
B/C Ratio	2.0	2.8	1.1	2.0	2.2	5.0

- (1) Number in 1,000s at December 1981 price levels, 7-5/8 percent discount rate. Benefits are positive net benefits.
- (2) Associated costs were not included in analysis. They are included in the next iteration.
- (3) OSE-Other Social Effects; NED-National Economic Development; RED-Regional Economic development; EQ-Environment Quality.

least expensive with total project investment costs of \$2,278,000. Plan 2 is only slightly more expensive (\$2,929,000) but boat capacity doubles. Plan 5 is most costly (\$3,627,000) but has an added feature of allowing recreational and commercial traffic separation at the entrance channel. Associated costs for Plan 1 are \$1,938,000, while the larger Plans 2 and 5 each require \$3,500,000 for these costs.

The boating demand analysis, conducted during preliminary planning, indicated that a 600-slip marina is preferable to a smaller size. In this instance, the total cost differential between Plan 1 and 2 is so slight that one would not prefer the smaller mooring area of Plan 1. The breakwater length is approximately equal between the two plans, creating similar land-based fishing opportunities. The water area just northerly of the breakwater in Plan 1 is better utilized as additional mooring area in Plan 2. No other use of this area is probable if Plan 1 is implemented; therefore, resource opportunities are wasted under this plan. Therefore, Plan 1 is dropped from further consideration.

Plan 6, the nonstructural plan, is dropped from further consideration because of its generally poor performance against the planning objectives and because the best aspects of the plan will probably be constructed by the city of Lorain before this study is completed.

Plan 2 demonstrates the best benefit/cost ratio and lowest cost-per-slip value of any plan. This plan is viable, implementable, and functional. Total costs are lower than any other plan with comparably sized mooring basin. The basin size is determined by efficient use of available water area and certainly possesses capabilities for expansion beyond 600 slips if warranted by future study phase results or by demand realized subsequent to construction. Otherwise the relatively large water area provides opportunities for maneuvering or perhaps a sailing area for small-craft (15-feet or less). Costs would not be reduced by sizing the mooring area to the minimum required to berth 600 boats.

Plan 5 is chosen for further consideration because it provides an additional safety and convenience feature to the otherwise similar Plan 2. The separation of commercial and recreational vessel traffic at the marina entrance is desirable, but major navigation costs are about 25 percent higher than Plan 2. Since the economic efficiency of Plan 5 is relatively high despite cost additions ($B/C = 2.3$), its implementability seems most related to public and administrative opinion of the trade-off between increased expenditures and functional ease of the separated entrance. This trade-off requires further evaluation in the next iteration, where the plans will be developed in more detail and the estimates will be refined.

Summary

Five structural alternatives and one nonstructural were developed during preliminary planning to address the small-boat harbor needs at Lorain Harbor, OH. Two of these plans, Alternatives 3 and 4, were developed specifically to accommodate the Riverside Park Cut feature of the commercial navigation

study. The other three plans addressed two different marina sizes, one for 300 boats (Alternative 1) and two plans for 600 boats (Alternatives 2 and 5).

Alternatives 3 and 4 have been eliminated from further consideration because there is no longer a need to provide for the Park Cut for commercial navigation. Alternative 1 has also been eliminated because of its relatively inefficient use of the available water area as compared to other alternatives.

The two remaining plans, Alternatives 2 and 5, are very similar plans and provide for efficient use of the available water area and potential for expansion beyond the initial 600 boat capacity, if warranted. These two plans will be considered in further detail in this study.

ITERATION 3 - DETAILED ANALYSIS

The emphasis during this iteration was to conduct a more detailed analysis. The two plans (2 and 5) were modified during this phase due to changes in technical criteria. These changed criteria are presented below. (see plates 12 & 13).

Criteria

Technical Criteria for the wave height and lake level was determined to be either a 20-year wave height in combination with the 10-year lake level or the 10-year wave height with a 20-year lake level. The most severe situation should be used for the design of the structures. (NOTE: Lake level is defined as the measure for Lake Erie which has a recurrence interval of 10 or 20 years combined with a short-term peak rise which has a 1-year recurrence interval.)

We assumed the Eastern Basin expansion discussed in the commercial navigation study would be completed. Because of this deepening, it was necessary to move the breakwaters shoreward to allow at least 200 feet from them and the deepened Eastern Basin. This was done because of slope stability concerns. Design of the breakwaters is discussed in Appendix D.

The width of the entrance channel was reduced to lessen the impact of moving the breakwater. This width is still considered adequate for the proposed marina.

Economic Criteria used in the benefits analysis was changed from the depreciated boat values used in Step 2 to the travel cost method which attempts to measure consumer surplus.

Plan Descriptions

The plans are shown on Plates 12 and 13. The channel dimensions, parking areas, and the layout in general were done in more detail. Because of the changed without condition, namely the commercial improvement to the Eastern

Basin of the Outer Harbor assumed to be completed, not only were the breakwaters moved, but they were redesigned to withstand larger waves. These changes resulted in an increase in the cost of the alternatives.

Trade-Offs

The revised estimates for Plans 2 and 5 came out virtually equal. They are presented in Table 3 on the following page.

We recognize that the most economical plan is to develop a small-boat harbor for the most number of boats possible. However, since both plans make efficient use of the water area, the primary trade off is the slight increase in water area versus the added safety of a dual entrance (Plan 2 vs. 5), not the more traditional economic (NED) or environmental (EQ) concerns, as the net benefits and environmental impacts are essentially the same for both plans. Because the boating season is constrained by seasonal variations and the climatological conditions on Lake Erie can change quickly, it is our conclusion that the advantages of an additional entrance outweigh the benefits of the slightly larger marina. Therefore, we select Plan 5, the detached breakwater plan, as the better plan. However, because of the significant investments required by the non-Federal sponsor to construct either plan, their recommendations during the public review of this report will be given upmost consideration before the final report's recommendations are submitted.

Table 3 - Construction Estimates for Plans 5 and 2
(February 1983 - Price level)

	:	5	:	2
First Cost (Shared 50/50)	:		:	
Breakwaters	:		:	
Armor Stone	:	\$ 926,250	:	\$ 896,250
Underlayer Stone	:	780,200	:	751,150
Core Stone	:	629,650	:	634,790
Walking and Handrail	:	84,000	:	120,750
Navigation Lights & Foundation:	:	<u>27,300</u>	:	<u>9,100</u>
	:	2,447,400	:	2,412,040
Contingencies (25 Percent)	:	612,600	:	604,960
E&D	:	184,000	:	181,000
S&A	:	<u>256,000</u>	:	<u>252,000</u>
TOTAL FIRST COST	:	3,500,000	:	3,450,000
Associated Cost (100 Percent	:		:	
Non-Federal - Same Both Plans)	:		:	
Administration Building	:	\$ 410,000	:	
Parking and Security	:	650,000	:	
Boat Launch Ramps	:	45,000	:	
Boat Docks (600)	:	2,529,000	:	
Fuel Dock	:	<u>10,000</u>	:	
	:	3,644,000	:	
Contingencies	:	838,000	:	
E&D	:	496,000	:	
S&A	:	374,000	:	
Lands and Damages (9 Acres)	:	<u>198,000</u>	:	
TOTAL ASSOCIATED COST	:	5,550,000	:	

Selected Plan

The Selected Plan, a small-boat harbor with a surface area of about 37 acres, is shown on Plate 13 at the end of the report.

PLAN COMPONENTS

The plan provides an all-weather recreational harbor with capacity for 600 slips. The structural features are an 800-foot breakwater, a 425-foot detached breakwater, and two entrance channels, each 275 feet wide. The plan utilizes a portion of the diked disposal area for parking and support facilities. Because of the relatively deep water available at the site, no dredging is planned.

PLAN ACCOMPLISHMENTS

In addition to meeting the projected demand of 600 slips in 1990, the plan provides sufficient water area for future expansion well beyond the projected 600 slips. The plan also provides two entrances to minimize any interference with commercial navigation entering or exiting the Black River Channel.

Recreational fishing is enhanced in the plan by providing an 3.5-foot wide path on the top of the 800-foot long main breakwater. Small-boat harbors traditionally provide excellent areas for ice fishing as they usually freeze early and stay frozen later than the rest of the lake.

The plan also assumes that the dock facilities have an economic life of about 25 years. To achieve a 50-year project life, we planned an additional expenditure of \$2,000,000 in the year 2016 to replace all the boat dock facilities. This capital expenditure was then discounted back to present worth using 7-7/8 percent. This resulted in an increase of \$309,000 in the first cost of the associated costs.

ENVIRONMENTAL IMPACTS

No significant environmental impacts are expected by this project.

U. S. Fish and Wildlife Service (USF&WS) pointed out in their Draft Coordination Act Report that the breakwaters may actually enhance the fishing

habitat of the harbor. However, they're acceptance of the Plan was conditioned by the following two recommendations:

- a. That the strict prohibition of the discharge of pollutants into the small-boat harbor be made a part of the Local Cooperation Agreement; and
- b. That water quality within the small-boat harbor be monitored and remedial measures be undertaken to alleviate any further significant degradation of water quality that occurs as a result of the construction and operation and maintenance of the small-boat harbor.

The Corps of Engineers concurs with the USFWS's first recommendation. This recommendation would be implemented through item (d) of the local cooperation agreement. Under item (d), the local cooperator (i.e. the Lorain Port Authority) would be required to regulate discharges and to be responsible for pollution protection in the harbor area.

The second recommendation has been considered during the final feasibility stage of the study; however, the Corps of Engineers cannot fully accept this recommendation as stated. Based upon experience at other small-boat harbors, the Corps of Engineers does not believe that any serious water quality problems would develop in the harbor area, therefore does not feel it is necessary to require itself or the Port Authority to initiate a water quality monitoring program.

The Corps contractor would be required to prepare and implement an environmental protection plan which would be consistent with the Corps of Engineers Civil Works Construction Guide for Environmental Protection (CW-01430) dated 1978. During project construction, the contractor would be required to implement all appropriate measures to minimize water quality problems. If, after construction and during use of the harbor, water quality does appear to be a problem, the recommended monitoring program could be conducted by the Port Authority or by the Corps under the O&M program. If a water quality problem is traced to a design problem of the harbor itself, this could be corrected under other Corps authorities (i.e. O&M program).

ECONOMICS SUMMARY

Economic justification is based on the degree of feasibility the plan indicates when costs and benefits are compared. The costs and benefits for this project were evaluated for a 50-year period at a discount rate of 7-7/8 percent.

The economic analysis first concentrated on the small-boat harbor by itself; then we analyzed the recreation fishing improvement to see if adding this to the small-boat harbor was justified and it was.

In addition to the traditional economic comparison for the Federal project (breakwaters, etc.), we also conducted a separate economic analysis of the associated costs (docks, parking, etc.) to determine if they were economically justified and a reasonable investment for the locals. This analysis used estimated revenues that a marina at the site might expect to offset the costs

of the investment. The results are summarized in Table 4 in terms of average annual costs and benefits. In addition to the average annual analysis, we calculated the pay back period for the associated costs to be about 10 years.

Table 4 - Summary of Annual Costs

Item	:	Cost (\$)
Small-Boat Harbor	:	
Interest & Amortization (I&A)	:	306,400
Operations & Maintenance (O&M)	:	<u>67,600</u>
	:	374,000
Recreational Fishing	:	
I&A	:	10,600
O&M	:	<u>2,400</u>
	:	13,000
Associated Costs	:	
I&A	:	460,000
O&M	:	<u>85,700</u>
	:	545,700
TOTAL AVERAGE ANNUAL COSTS	:	932,700

Table - Summary of Annual Benefits

Item	:	Benefits
	:	\$
Small-Boat Harbor	:	1,389,900
Recreational Fishing	:	45,200
Associated Costs	:	<u>551,000</u>
TOTAL ANNUAL BENEFITS	:	1,986,100

The proposed plan is economically justified and has a benefit-to-cost ratio of 3.7 $((1,389,900 + 45,200)/(374,000 + 13,000))$. The associated costs were not included in this calculation.

Plan Implementation

This section summarizes the cost apportionment for the Selected Plan as well as the implementation responsibilities and views of the non-Federal interest.

REVIEW AND IMPLEMENTATION

After the report has been under public review for 45 days, any comments will be incorporated into the report and it will then be forwarded to our Division headquarters for final review. Normally, after Division's final review, the report would be forwarded to the Board of Engineers for Rivers and Harbors (BERH) which conducts an independent review of Corps reports before they are approved and sent on to Congress. However, since the Federal portion of the cost estimate for this small-boat harbor is currently less than \$2,000,000, (see table 5 following) it is possible to construct the project under Section 107 of the River and Harbor Act of 1960, as amended. This Act delegates the authority to construct such small navigation projects to the Chief of Engineers. If this path were followed, and the report was approved, we could move directly into plans and specifications without any need for review by the BERH. Some of the considerations that affect this decision are:

a. Cost limitation for the Federal share under the Section 107 authority is \$2,000,000 which usually includes study costs. Any costs over \$2,000,000 must be paid by the local sponsor.

b. Construction of the small-boat harbor before the confined disposal is complete (scheduled 1990) could restrict parking and hinder operation of the marina because of a dredge pumpout pipe going through the mooring and parking areas (Figure 7). Also, it is probable that there would be 4 or 6 weeks of maintenance dredging on the commercial channels during the summer months. This dredged disposal is expected to continue until about 1990 when the disposal area is scheduled to be filled.

Since the earliest construction scheduled would complete construction during 1986, if the Section 107 path were followed, we estimate that at least 8 acres would be available for parking and support facilities. This area is sufficient to support a 600-boat marina. Although dredge disposal in the confined disposal area during the summer is undesirable, the presence of the pumpout pipe near the shore could slightly disrupt marina development and restrict use of the



Figure 7 - Aerial Photo of outer harbor. (Note: small boat harbor site, rubber tired breakwater and progression of dredge fill in disposal area)

boat launching ramps to only boats that can get under the pipe. The clearance between the water and the bottom of the pipe is about 10 feet (Pipe to Low Water Datum). Since the average gage at Lorain is less the two feet, one might expect at least 8 feet of clearance on any summer day. This restriction only exists when dredging is underway because a section of the pipe is removed after the annual maintenance dredging is completed. (Figure 7- shows pipe open).

These restrictions are reviewed periodically with the Ohio Department of Natural Resources (ODNR) and U.S. Fish and Wildlife Service (USF&WL). As part of their review of this report, we have asked them to consider changing the restrictions on when annual maintenance dredging is allowed to eliminate the need for summer dredging. The period of concern is from 1987 to 1990 when the disposal area is estimated to be filled.

While it is desirable to eliminate the need for maintenance dredging during the summer, it is not necessarily viewed as precluding the 107 route, if it can't be accommodated.

DIVISION OF PLAN RESPONSIBILITIES

The Secretary of the Army is reviewing project cost-sharing and financing across the entire spectrum of water resources development functions. The basic principle governing the development of specific cost-sharing policies is that whenever possible, the cost of services produced by water projects should be paid for by their direct beneficiaries. Although only the traditional cost-sharing is presented here (Table 5) the reader should be aware that other ratios may be required by the Secretary of the Army before approving construction.

Table 5 - Cost Apportionment (Feb 83 Price Levels)						
Item	:	Total	:	Federal	:	Non-Federal
Lands and Damages	:	198,000	:		:	198,000
Breakwaters	:	2,448,000	:	1,224,000	:	1,224,000
Administration	:		:		:	
Building	:	410,000	:		:	410,000
Boat Docks	:	2,529,000	:		:	2,529,000
Parking Areas	:	650,000	:		:	650,000
Support Facilities	:	67,000	:		:	67,000
Contingencies at	:		:		:	
25 Percent	:	1,438,000	:	306,000	:	1,132,00
E&D	:	680,000	:	92,000	:	588,000
S&A	:	630,000	:	128,000	:	502,000
TOTAL	:	9,050,000	:	1,750,000	:	7,300,000

In addition to the preceding financial requirements and the items of local cooperation in the recommendations section of this report, the local sponsor must comply with all applicable laws and regulations. Two laws which are frequently mentioned, "The Uniform Relocation Acquisitions Policies Act of 1970 and Section 601 of Title VI of the Civil Rights Act of 1964," are noted for your information.

VIEWS OF NON-FEDERAL INTEREST

(Will be presented in Final)

Conclusions

Corps studies have shown there is a need for expanded small-boat facilities at Lorain Harbor. They have also shown that these needs can be best met by the construction of a small-boat harbor in Lorain Outer Harbor's East Basin. The plan will meet the projected demand of 600 additional slips in 1990. The plan also provides for expansion beyond the 600 slips in the future. This was accomplished during plan formulation to take advantage of the natural configuration of the basin at almost no additional expense to the Federal Government.

The utilization of the small project authority (Section 107 of the River and Harbor Act of 1960, as amended) could accelerate the construction schedule of the project. While there would be some conflict with the filling of the confined disposal area that could hinder immediate development of a 600-slip marina, the early construction of the project still seems desirable. However, considering the much larger contribution required by the local sponsor, their comments will be given serious consideration before the final decision is made.

Recommendations

I recommend that the Selected Plan described in this report be used as a basis for preparing plans and specifications, with such modifications as in the discretion of the Chief of Engineers may be advisable at a total estimated first cost of \$9,050,000 (February 1983 price levels) consisting of \$1,750,000 Federal cost and \$7,300,000 non-Federal. This recommendation is made provided that prior to construction, non-Federal interests furnish assurances satisfactory to the Secretary of the Army that they will:

a. Prior to construction, provide without cost to the United States, all lands, easements, and rights-of-way necessary for construction and maintenance of the project.

b. Provide and maintain a 600-slip marina with adequate public access facilities, including launching ramps and a public dock, landing or berthing area for transient vessels, all with sanitary facilities, parking space, with provisions for the sale of motor fuel, lubricants and potable water, available to all on equal terms.

c. Provide and maintain depths in berthing and mooring areas commensurate with those provided in the Federal project.

d. Establish and enforce regulations prohibiting discharge of pollutants into the waters of the harbor area by users thereof, which regulations shall be in accordance with applicable laws and regulations of Federal, State and local authorities responsible for pollution protection. Provide facilities for onshore disposal of untreated sewage, garbage, debris and other pollutants.

e. Maintain and replace recreational fishing facilities.

f. Hold and save the United States free from damages due to the construction and maintenance of the project except for damages due to the fault or negligence of the United States or its Contractors.

g. Accomplish without cost to the United States such relocations or alterations of utilities as necessary for project purpose.

h. Establish a competent public body empowered to establish and enforce rules to control the use and growth and development of the harbor with the understanding that public facilities will be open to all on equal terms.

1. Contribute in cash 50 percent of that portion of the first cost allocated to recreational navigation and fishing exclusive of aids to navigation promptly upon receipt of written notice from the Secretary of the Army or his representative.

Such contribution has been currently estimated to be \$1,750,000, February 1983 price levels, to be paid in a lump sum prior to construction or by installments during the construction period at a rate proportionate to the proposed or scheduled expenditure if Federal funds as required by the Chief of Engineers, the final apportionment of the cost to be made after actual costs have been determined.

I further recommend that, if necessary, the improvements for navigation may be undertaken independently of providing public recreational fishing facilities whenever the required local cooperation for navigation has been furnished, and that public fishing developments be accomplished if necessary or desirable.

I also recommend that the required associated project development on the confined disposal area take precedence over any required approval of such use by the Secretary of the Army under Section 123 of PL 123 and PL 91-611.

ROBERT R. HARDIMAN
Colonel, Corps of Engineers
District Engineer

PLATES

LAKE ERIE



2000

1000

0

SCALE IN FEET

LAND
FACILITIES

BERTHING AREA

FEDERAL CHANNEL

BREAKWATER 900'

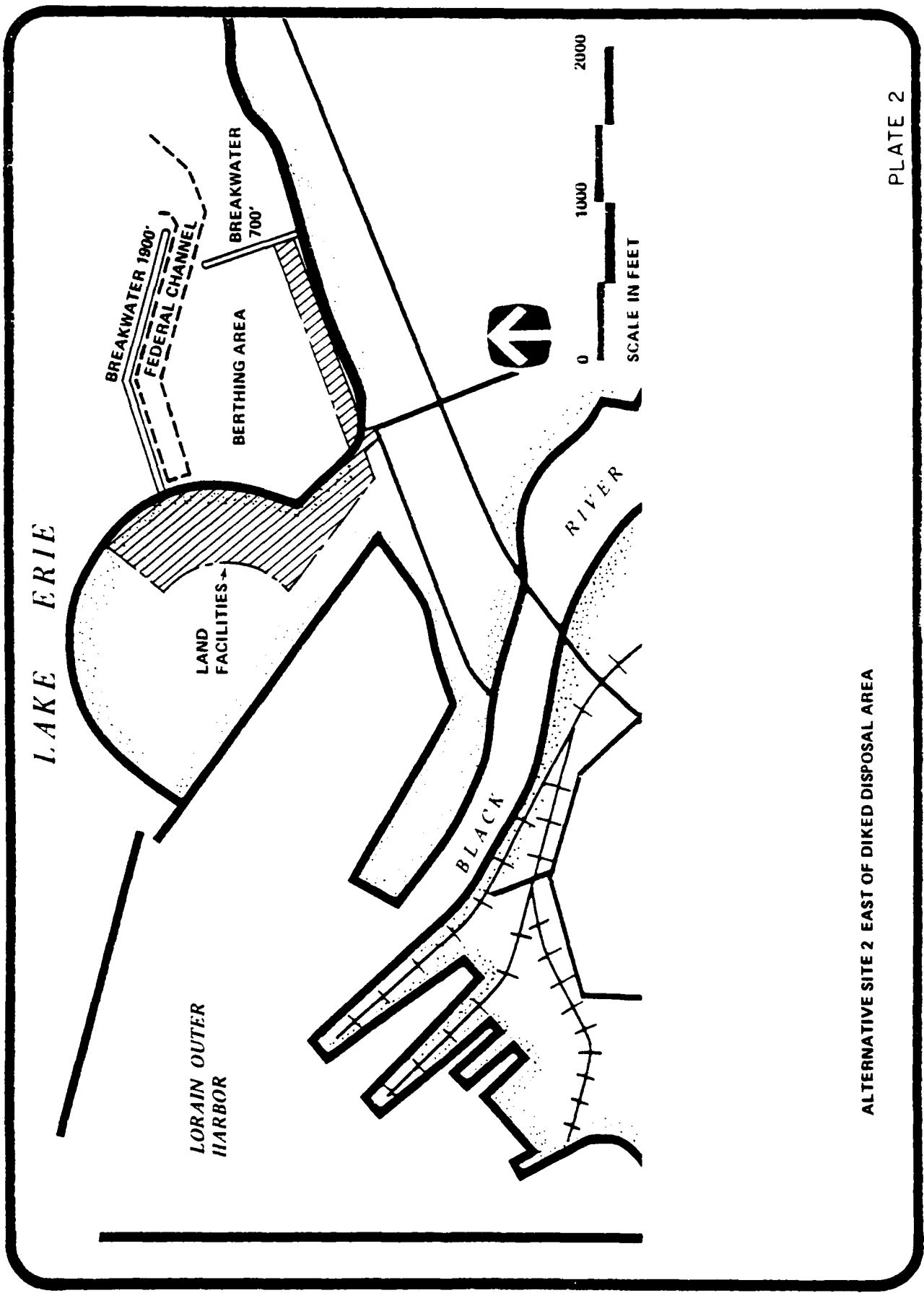
LORAIN OUTER
HARBOR

BLACK

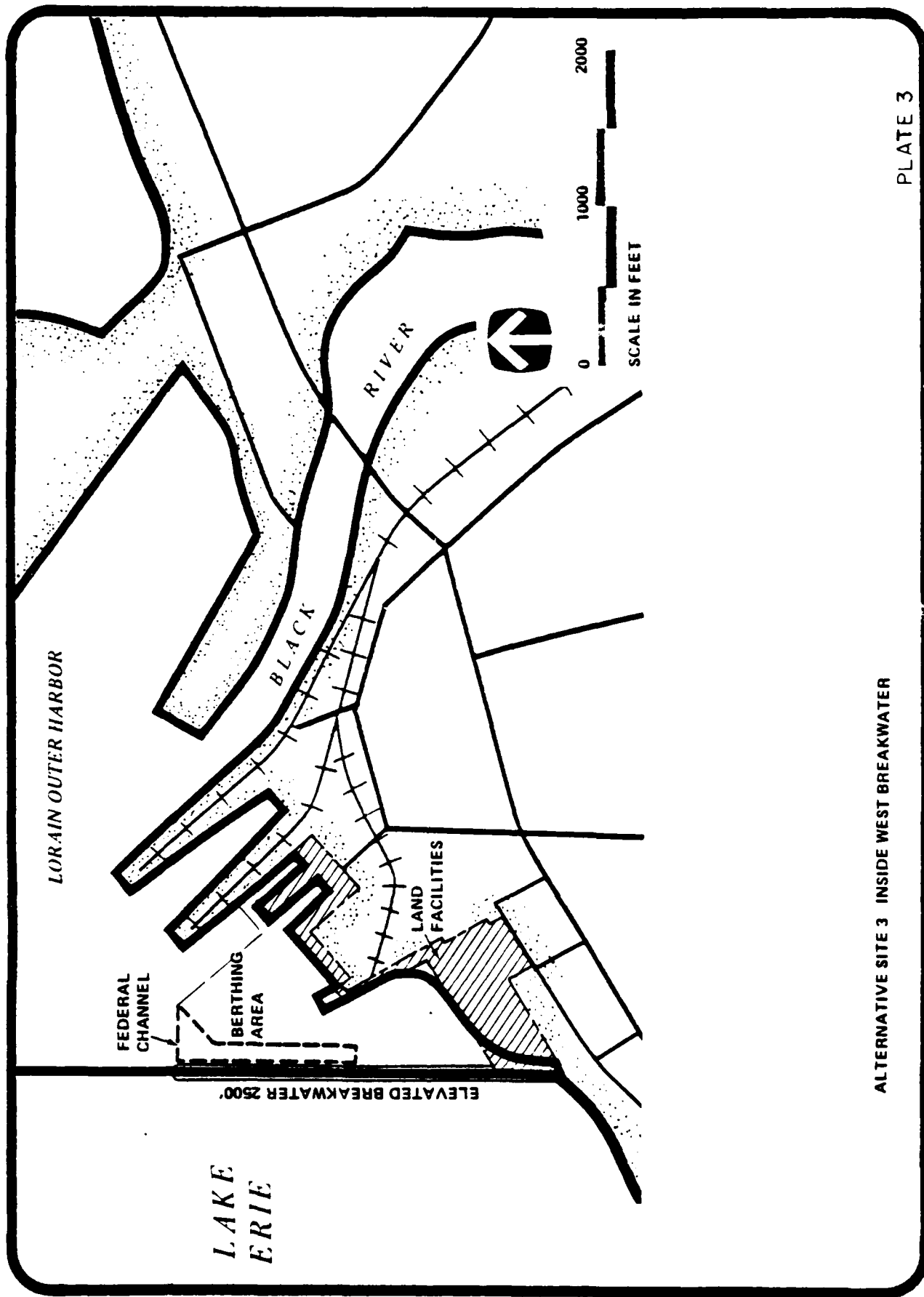
RIVER

ALTERNATIVE SITE 1 INSIDE EAST BREAKWATER

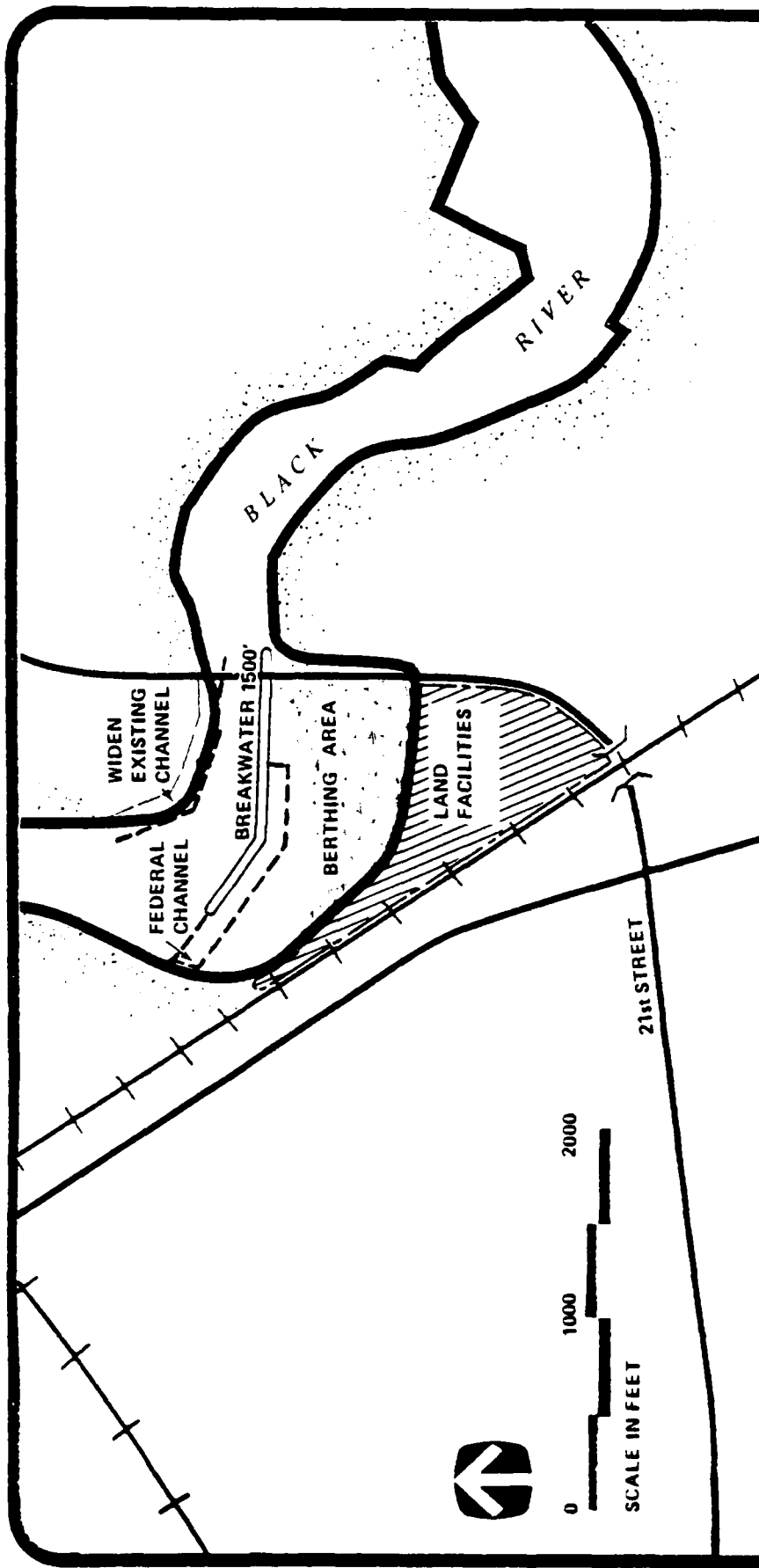
PLATE I



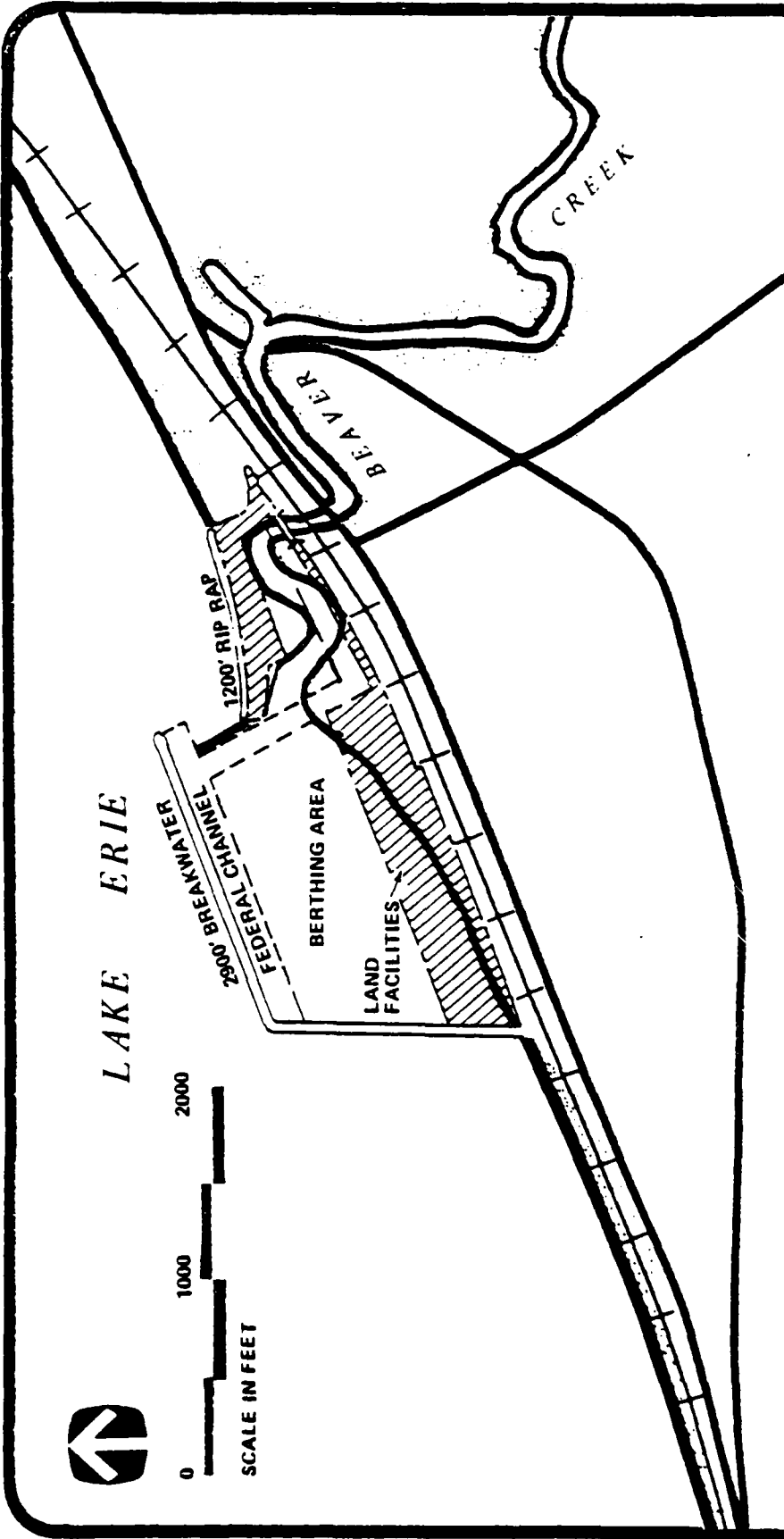
ALTERNATIVE SITE 2 EAST OF DIKED DISPOSAL AREA



ALTERNATIVE SITE 3 INSIDE WEST BREAKWATER



ALTERNATIVE SITE 4 BLACK RIVER AT 21ST STREET



LAKE ERIE

200' BREAKWATER

1200' RIP RAP

BERTHING AREA

LAND FACILITIES

BEAVER CREEK

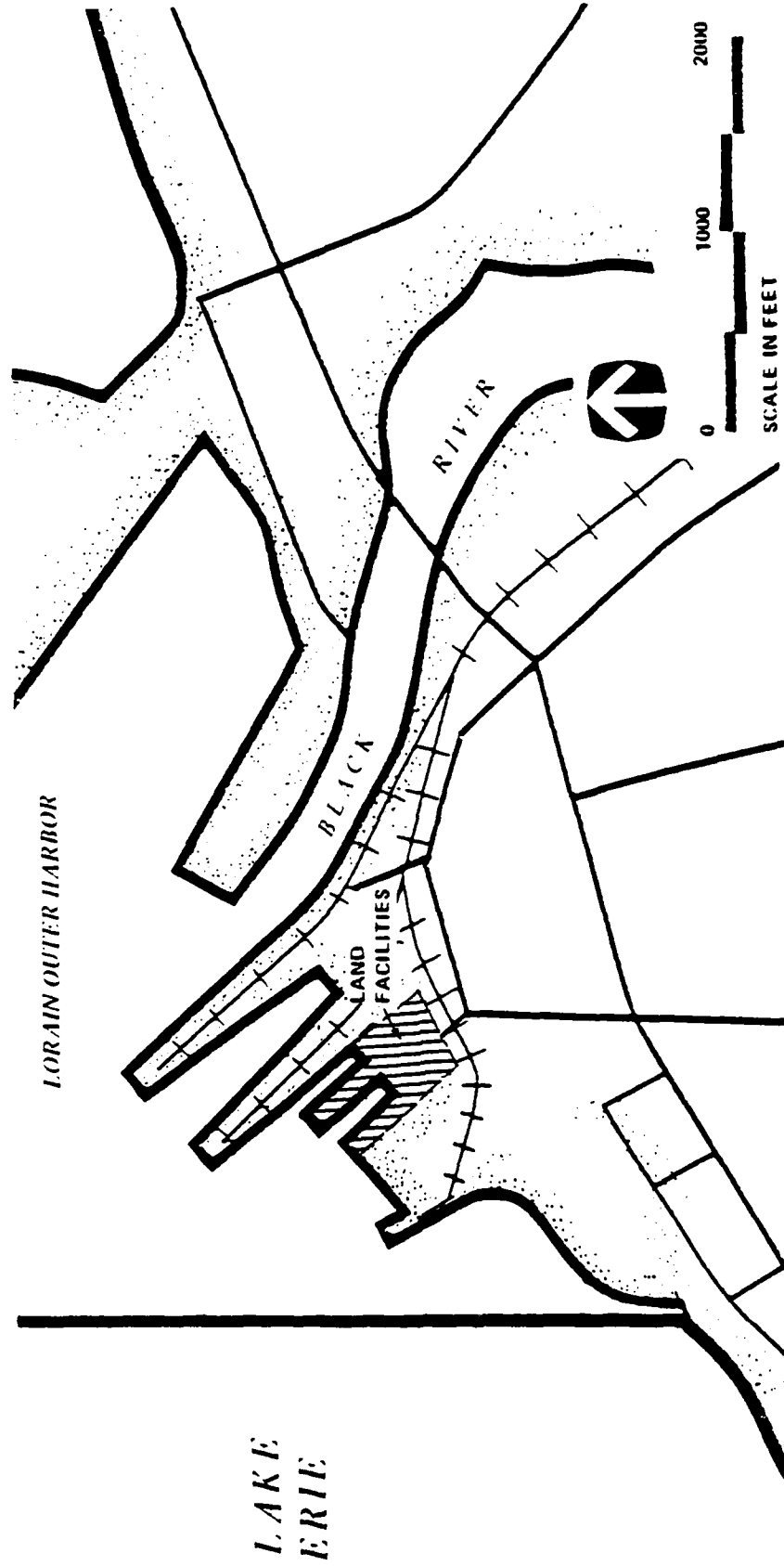


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SCALE IN FEET

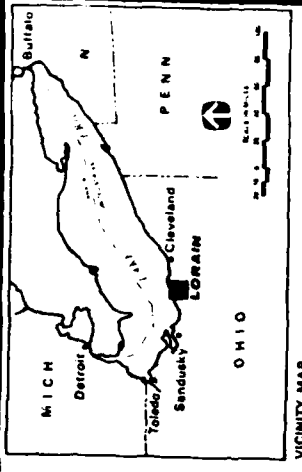
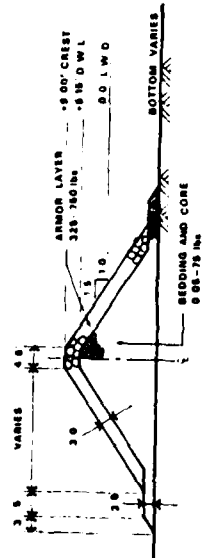
ALTERNATIVE SITE 5 BEAVER CREEK

PLATE 5



ALTERNATIVE SITE 6 NON-STRUCTURAL

LAKE ERIE

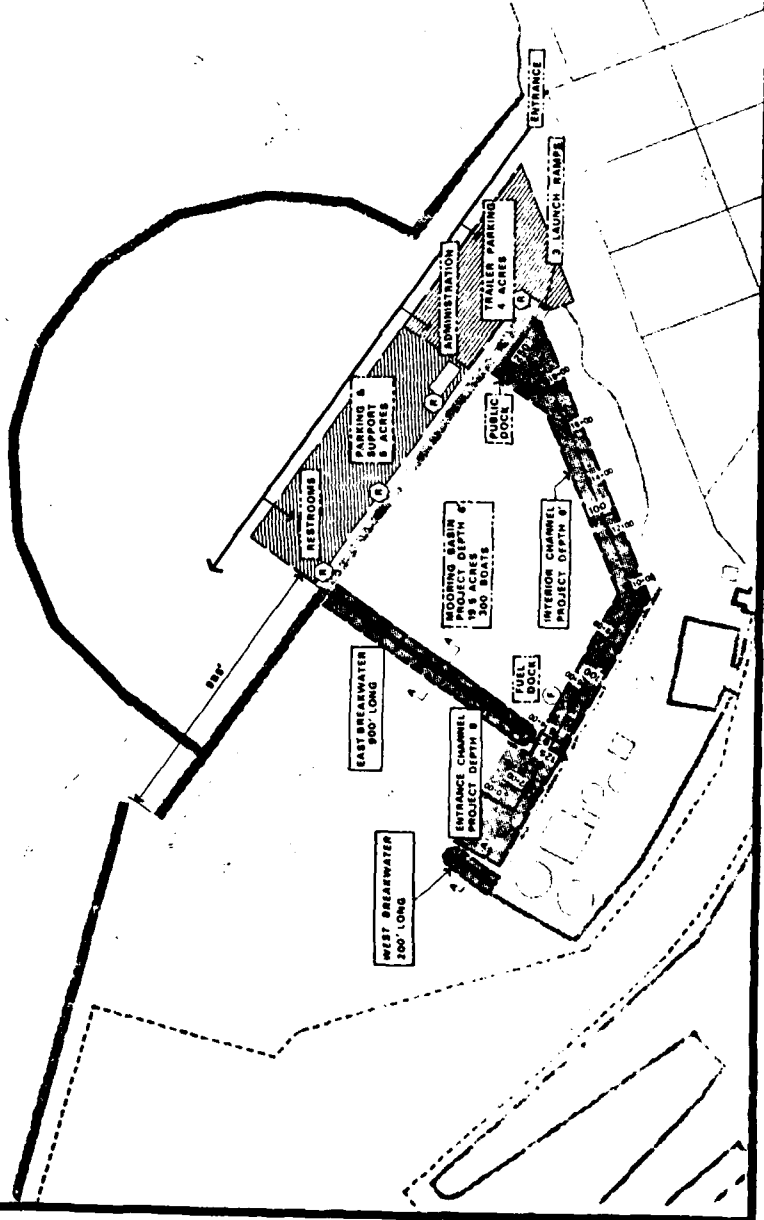
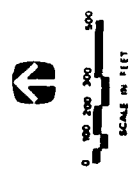


NOTES:

1. ALL ELEVATIONS REFER TO LOW WATER JATUM (L.W.J.) ELEVATION 568.6 FEET ABOVE MEAN WATER LEVEL AT FATHER POINT QUEBEC (IGLD 1985).
2. D.W.L. DESIGN WATER LEVEL

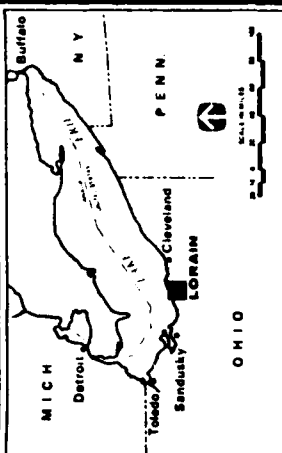
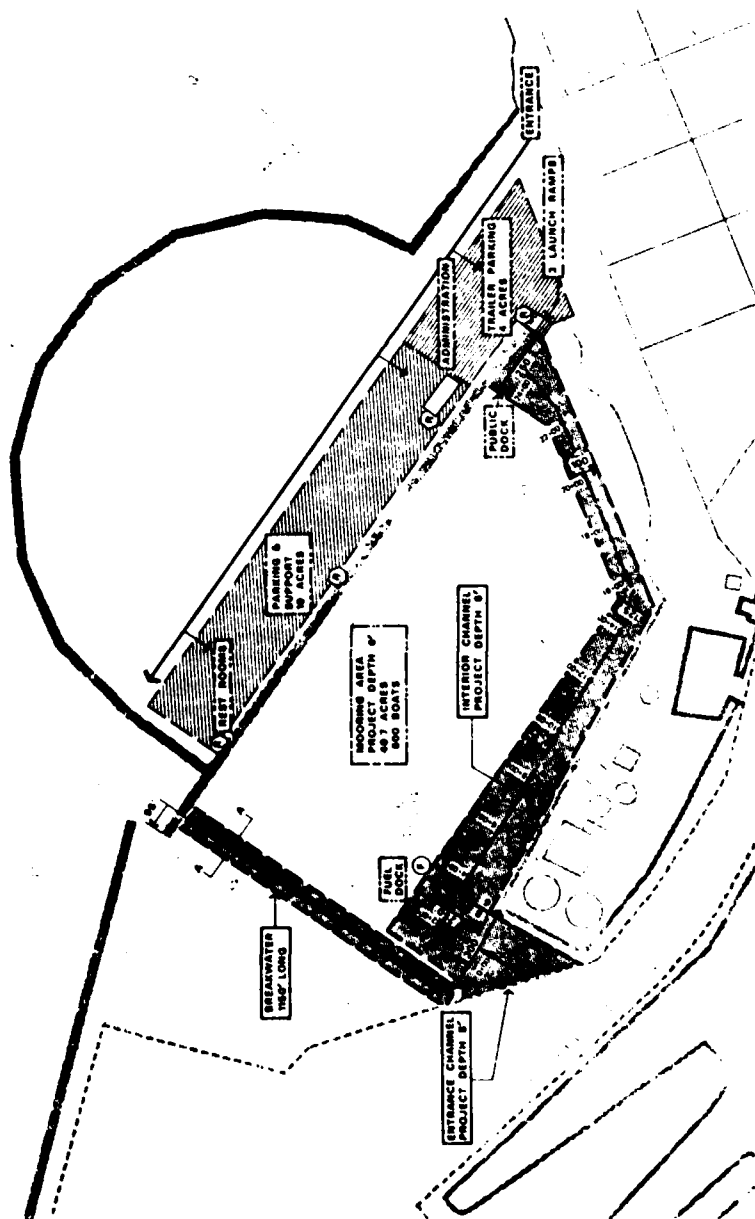
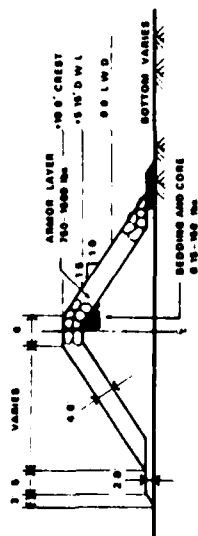
LEGEND:

- COMPONENTS OF THE GENERAL NAVIGATION PROJECT (COST SHARED ITEMS AT 50% FEDERAL AND 50% NON-FEDERAL)
- COMPONENTS OF THE NAVIGATION PROJECT WHICH ARE A NON-FEDERAL RESPONSIBILITY
- FUEL DOCKS
- RESTROOMS



SECTION	SMALL BOAT HARBOR
PROJECT	PRELIMINARY FEASIBILITY REPORT
DESIGN	ALTERNATIVE 1
DATE	1985
BY	10/1
CHECKED	10/1
APPROVED	10/1
SCALE	1" = 100'
PLATE	7
300 SUP CAPACITY WITHOUT RIVERSIDE PARK CUT	

LAKE ERIE

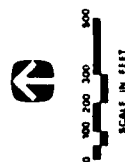


NOTES:

- 1 ALL ELEVATIONS REFER TO LOW WATER JATUM (L.W.J.) ELEVATION 568.8 FEET ABOVE MEAN WATER LEVEL AT FATHEN POINT QUEBEC (IGLD 1985)
- 2 D.W.L. DESIGN WATER LEVEL

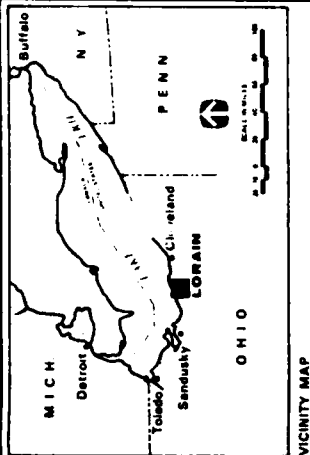
LEGEND:

- COMPONENTS OF THE GENERAL NAVIGATION PROJECT (COST SHARED ITEMS AT 80% FEDERAL AND 20% NON FEDERAL)
- COMPONENTS OF THE NAVIGATION PROJECT WHICH ARE A NON FEDERAL RESPONSIBILITY
- FUEL DOCK
- RESTROOMS



DESIGNED BY		LORAIN, OHIO	
CHECKED BY		SMALL BOAT HARBOR	
APPROVED BY		PRELIMINARY FEASIBILITY REPORT	
RECOMMENDED BY		ALTERNATIVE 2	
DATE		JULY 1984	
BY		JULY 1984	
FOR		800 SLIP CAPACITY WITHOUT RIVERSIDE PARE CUT	

PLATE 8



NOTES:

- 1 ALL ELEVATIONS REFER TO LOW WATER JATUM
(L.W.D.). ELEVATION 508.6 FEET ABOVE MEAN WATER
LEVEL AT FATHER POINT, QUEBEC (IGLD 1985)
- 2 DWL DESIGN WATER LEVEL

LEGEND:

COMPONENTS OF THE GENERAL NAVIGATION PROJECT
(COST SHARED ITEMS AT 90% FEDERAL AND 90%
NON FEDERAL)

COMPONENTS OF THE NAVIGATION PROJECT WHICH ARE
A NON FEDERAL RESPONSIBILITY

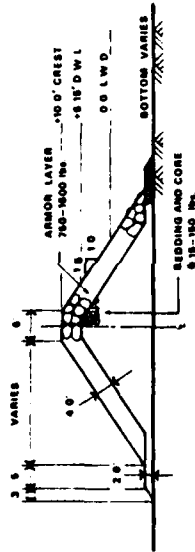
FUEL DOCKS

RESTROOMS

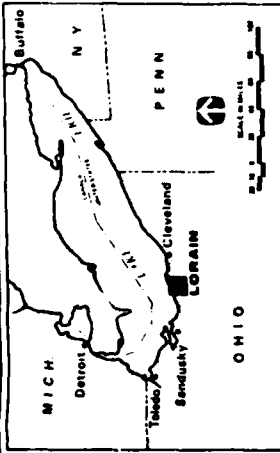
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PLATE 9

LAKE ERIE



SECTION A - A



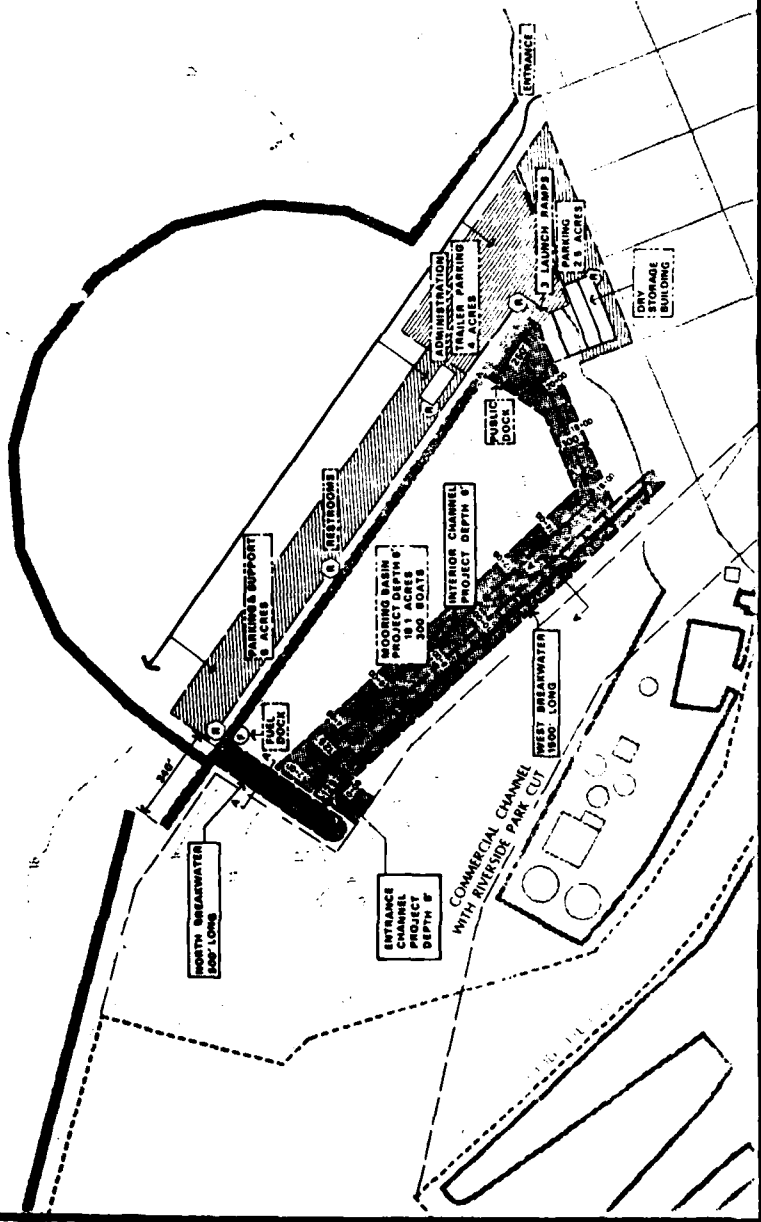
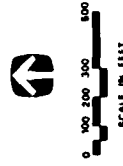
VICINITY MAP

NOTES:

1. ALL ELEVATIONS REFER TO LOW WATER JATUM (L.W.D.). ELEVATION 588.5 FEET ABOVE MEAN WATER LEVEL AT FATHER POINT, QUEBEC (IGLD 1985).
2. D.W.L. DESIGN WATER LEVEL.

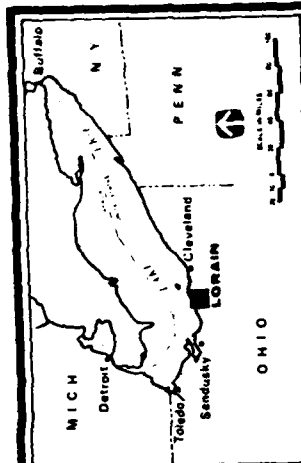
LEGEND:

- COMPONENTS OF THE GENERAL NAVIGATION PROJECT (COST SHARED ITEMS AT 50% FEDERAL AND 50% NON-FEDERAL)
- COMPONENTS OF THE NAVIGATION PROJECT WHICH ARE A NON-FEDERAL RESPONSIBILITY
- FUEL DOCKS
- RESTROOMS



REGION	LORAIN, OHIO
PORT	SMALL BOAT HARBOR
PROJECT	PRELIMINARY FEASIBILITY REPORT
DATE	ALTERNATIVE 4
DESIGNED BY	
CHECKED BY	
APPROVED BY	
DATE	
SCALE	
PLATE 10	800 SLIP CAPACITY WITH RIVERSIDE PARK CUT

SECTION A . A



VICINITY MAP

NOTES:

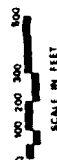
- 1 ALL ELEVATIONS REFER TO LOW WATER JATUM
(L.W.D.) ELEVATION 888.8 FEET ABOVE MEAN WATER
LEVEL AT FATHER POINT QUEBEC (GOLD 1955)
- 2 D.W.L. DESIGN WATER LEVEL

LEGEND:

COMPONENTS OF THE GENERAL NAVIGATION PROJECT
COST SHARED ITEMS AT 50% FEDERAL AND 50%
(NON-FEDERAL)

COMPONENTS OF THE NAVIGATION PROJECT WHICH ARE
NON-FEDERAL RESPONSIBILITY

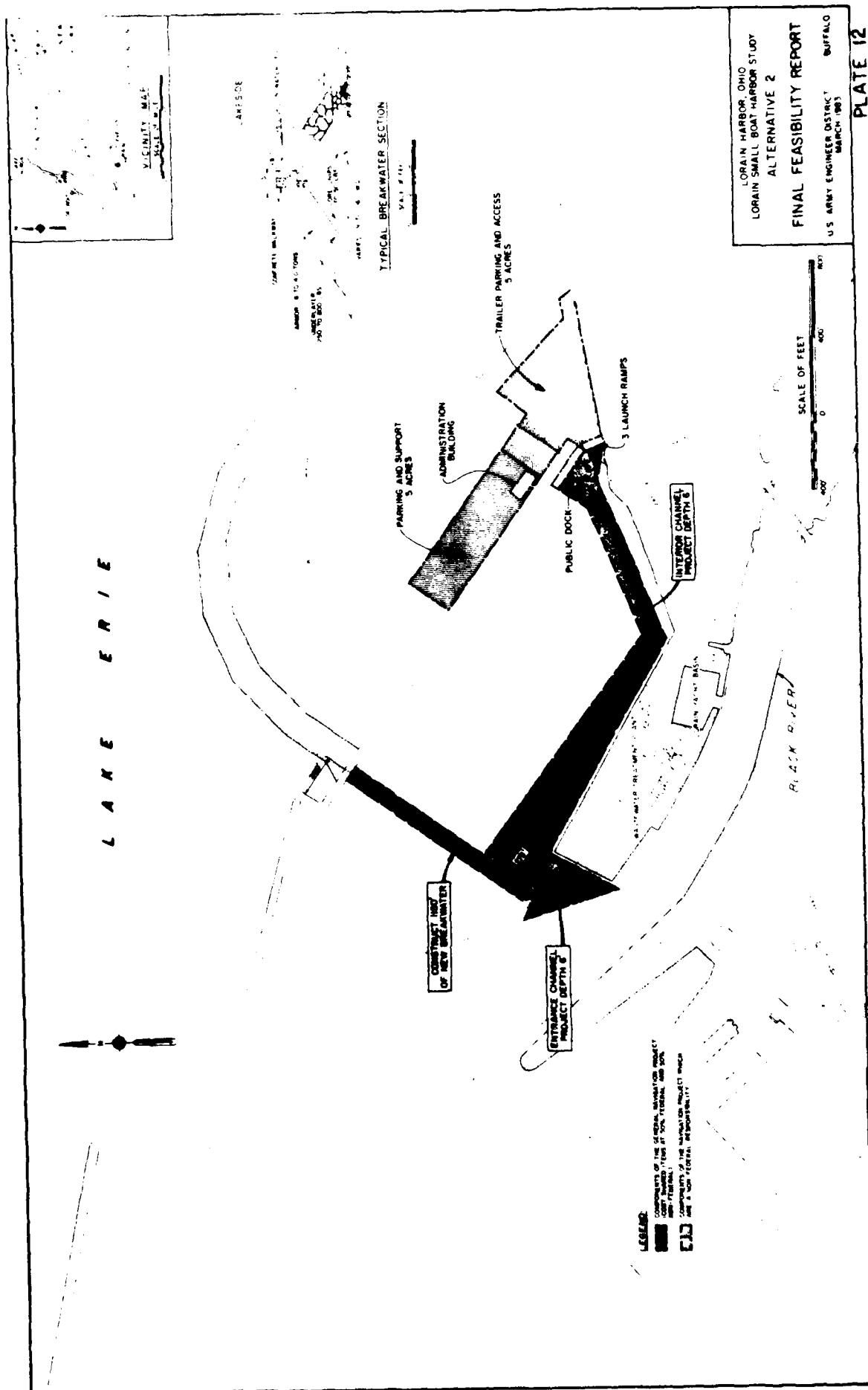
(F)	FUEL DOCKS
(R)	RESTROOMS



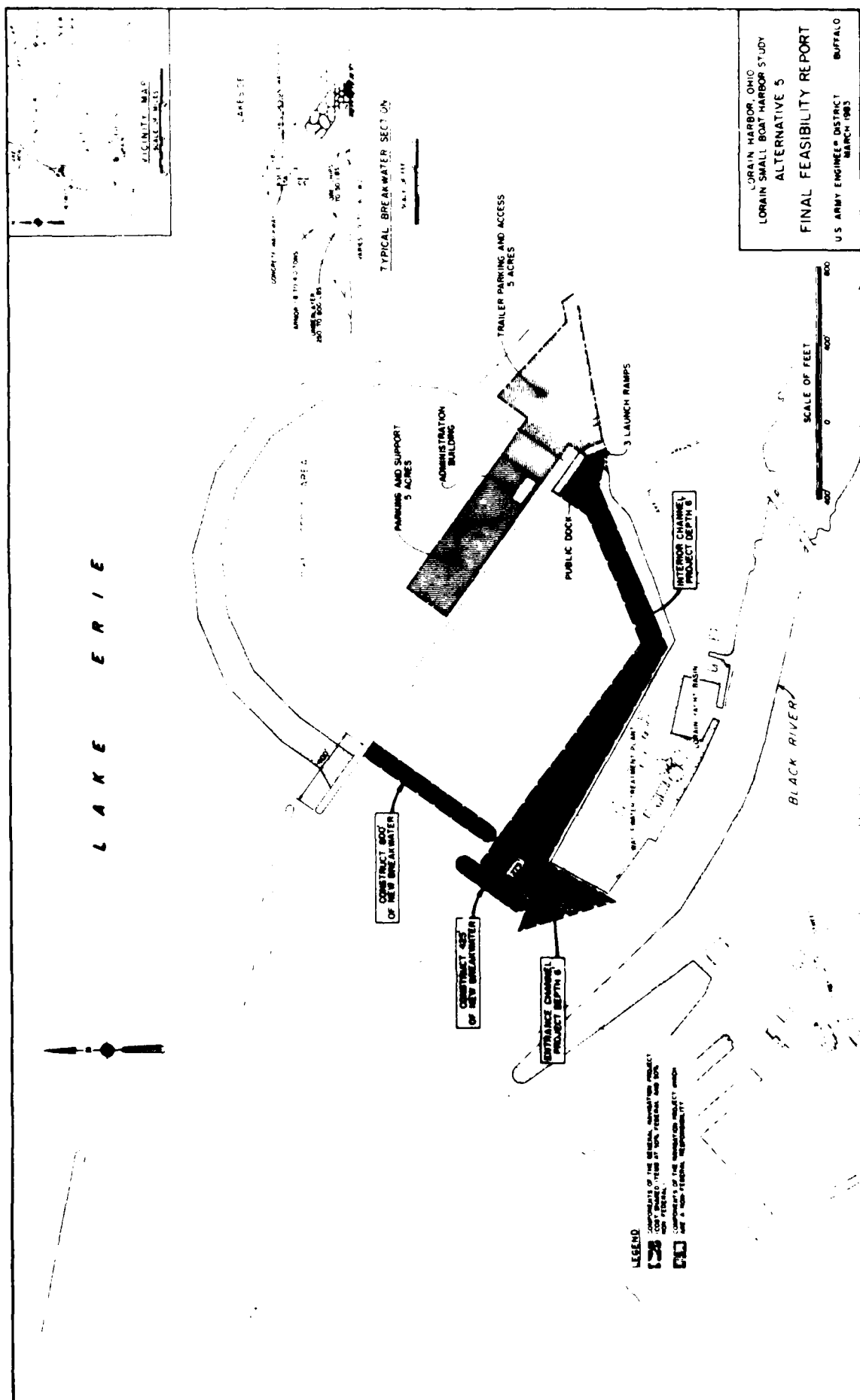
RECORDED	INDEXED	FILED	SEARCHED	SERIALIZED	FILED	PLATE 11
NOV 1964	NOV 1964	NOV 1964	NOV 1964	NOV 1964	NOV 1964	800 SLIP CAPACITY WITH DETACHED ORIGINAL
LORAIN, OHIO SMALL BOAT HARBOR PRELIMINARY FLASHTYPE REPORT ALTERNATIVE 5						BUFFALO DISTRICT OFFICE BUFFALO, NEW YORK

PLATE II

has the capacity with detached breakwater



LORAIN HARBOR, OHIO
 LORAIN SMALL BOAT HARBOR STUDY
 ALTERNATIVE 2
FINAL FEASIBILITY REPORT
 U.S. ARMY ENGINEER DISTRICT BUFFALO
 MARCH 1993



DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR
RECREATIONAL NAVIGATION STUDY
AT LORAIN HARBOR
LORAIN COUNTY, OHIO

The responsible lead agency is the U.S. Army Engineer District, Buffalo.
The responsible cooperating agency is the Lorain Port Authority.

Abstract: Lorain, OH, is located on the southern shore of Lake Erie, approximately 25 miles west of Cleveland and 90 miles east of Toledo. The Buffalo District has investigated public concerns of the Lorain Harbor study area related to inadequate facilities for recreational navigation. Of the five alternatives initially considered as potential small-boat harbor sites, one was chosen as the specific site for the project. This site is Alternative Site No. 1 - Inside the East Breakwater at Lorain Harbor. At this site, five alternative plans for the small-boat harbor design, in addition to the No-Action Plan, were investigated. Of the five plans initially considered, two, in addition to No Action, were selected for detailed study. Alternative 2 would provide an all-weather small-boat harbor with a 600-slip capacity, but would direct all recreational traffic into the Lorain Harbor commercial navigation channel. Alternative 5 would provide an all-weather recreational harbor with a 600-slip capacity and a detached breakwater. Recreational traffic would still encroach upon commercial traffic but a northeast outlet to Lake Erie would be provided. Both alternatives would provide breakwater access for recreational fishing. Alternative 5 has been tentatively selected based on its performance in addressing the identified public concerns, its net positive contribution to the goal of National Economic Development, and its consideration of the principles of environmental and natural resource conservation.

Send your comments to the District Engineer by JUL 25 1983

If you would like further information on this statement, please contact:

Mr. William Butler
U. S. Army Engineer District, Buffalo
1776 Niagara Street
Buffalo, NY 14207
Commercial Telephone: (716) 876-5454, extension 2173
FTS Telephone: 473-2173

NOTE: Information, displays, maps, etc. discussed in Lorain Small-Boat Harbor Main Report are referenced in the EIS.

DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR
RECREATIONAL NAVIGATION STUDY
AT LORAIN HARBOR
LORAIN COUNTY, OHIO

SUMMARY

This chapter presents the major factors which were considered in and influenced planning-related decisions. It is presented in the following four discussions:

a. Major Conclusions and Findings. This discussion identifies the alternatives that were considered and a brief rationale of why they were not selected. The rationale for the study's National Economic Development (NED) Plan, Least Environmentally Damaging (LED) Plan, and tentatively Selected Plan, and other major conclusions and findings of the District Engineer are presented.

b. Areas of Controversy. This section describes those issues that were the subject of major disagreement among public interests during the course of the study and the outcome of any resolved controversies.

c. Unresolved Issues. This section describes the unresolved major disagreements among study area interests and actions proposed or taken to resolve these disagreements.

d. Relationship to Environmental Protection Statutes and Other Environmental Requirements. This section summarizes the relationship of each plan included in the final array of alternatives to the requirements of environmental laws, executive orders, and other policies; the Federal, State, and local land use plans, policies, and controls applicable to the study area and other related State and local plans and laws; and any Federal permits, licenses, and other entitlements needed to implement the detailed plans. Table EIS-1 presents a summary of compliance with these requirements.

MAJOR CONCLUSIONS AND FINDINGS

As a first task in the planning process, problems in a study area are identified by eliciting information from the public about water and related land resources management needs. The needs identified for Lorain Harbor include: harbor modifications for commercial navigation to allow larger ships to utilize the harbor area and service area industry; additional marina facilities to serve recreational navigation demand; and reduction of sedimentation in the Black River; and, thus, reduction in harbor maintenance dredging and improved water quality. The thrust of this EIS is directed towards the investigation of recreational navigation needs at Lorain Harbor. Commercial navigation and sedimentation are addressed in separate reports.

As mandated by the Corps planning process, various alternative plans have been formulated to address area needs and planning objectives. These plans have been addressed and evaluated for social, economic, and environmental impacts. During preliminary feasibility planning, a total of five potential

small-boat harbor sites were identified. In addition, opportunities for nonstructural solutions were researched. Through detailed analysis and extensive public coordination, one site - Alternative Site No. 1 (Inside East Breakwater) - was chosen as the preferred site. After a harbor site was selected, six alternative harbor layouts, including the No-Action Plan, were analyzed. The plans were refined and two alternatives - Alternatives 2 and 5 - which would provide a 600-boat capacity, in addition to the No-Action Alternative, were recommended for further study.

In selecting the National Economic Development (NED) Plan, candidate plans must not only satisfy the planning objectives and evaluation criteria, they must also maximize net benefits. Based on an evaluation of plans developed during final feasibility planning, the results indicate that Alternative maximizes NED benefits with annual net benefits totalling \$1,452,900. Therefore, Alternative 2 is designated the NED Plan.

Recognizing that Environmental Quality (EQ) has both natural and human manifestations, the EQ Plan addresses the planning objectives in a way which emphasizes aesthetic, ecological, and cultural contributions. Beneficial EQ contributions are made by preserving, maintaining, restoring, or enhancing the significant cultural and natural environmental attributes of the study area. Developing an EQ Plan involves combining study specific measures which best address the EQ objectives developed for the study, while if possible, meeting other study objectives. EQ plans should not have adverse impacts which override their positive preservation and enhancement features. This means that candidate EQ plans must make net positive contributions to the components of the EQ account.

In some studies, it may be impossible to develop a plan that meets the minimum requirements for designating an EQ Plan, i.e., a plan that makes net positive contributions to the EQ account. In those cases, the plan which is least damaging to the environment will be identified. The Lorain Harbor Recreational Navigation Study is such a case.

Due to the commercial and industrial nature of the study area combined with poor water quality, sediment contamination and deep water depths, there is little opportunity to fulfill EQ objectives, which would lead to an EQ Plan. Therefore, the Least Environmentally Damaging (LED) Plan has been identified for this study.

Of the two action plans considered in detail, Alternative 5 (800-Foot Breakwater and 425-Foot Detached Breakwater) would provide a greater surface area of rocky benthic habitat (1.7 vs. 1.6 acres). Also, the northeast harbor outlet may slightly lessen potential water stagnation problems in the proposed harbor. For these reasons, Alternative 5 may be less environmentally damaging than Alternative 2, and therefore, has been designated the LED Plan.

The most economical plan is to develop a small-boat harbor for the greatest number of boats possible. However, since both plans make efficient use of the water area, the primary trade-off is the slight increase in water area versus the added safety of a dual entrance (Alternative 2 vs. 5). Because

the boating season is constrained by seasonal variations and the climatic conditions on Lake Erie can change quickly, the Buffalo District has concluded that the advantages of an additional entrance outweigh the benefits of a slightly larger marina. Therefore, Alternative 5 has been designated the tentatively Selected Plan. However, because of the significant investments required by the Lorain Port Authority to construct either plan, their recommendations during the public review of this report will be given utmost consideration before submittal of the final report's recommendations.

In regard to Executive Order (EO) 11990, Protection of Wetlands, none of the proposed alternatives would have any direct effect on any wetlands in the project area; therefore, this EO is complied with for the Lorain Harbor Recreational Navigation Study. The general objective of EO 11988, Flood Plain Management, is to avoid, to the maximum extent possible, long and short-term adverse impacts associated with the occupation and modification of the base flood plain whenever there is a practicable alternative to such an action. The Corps has concluded that there is no practicable alternative to the proposed action, which would occur within the 100-year flood plain of Lake Erie; therefore, the recommended action is in compliance with the Executive Order.

A Public Notice and evaluation in compliance with Section 404 of the Clean Water Act have been completed and are included with this EIS (see pp EIS-44-EIS-54). A section 401 State Water Quality Certificate, or waiver thereof, will be obtained from the Ohio Environmental Protection Agency upon their favorable review of the Section 404 Evaluation.

AREAS OF CONTROVERSY

The U. S. Fish and Wildlife Service has expressed concern that the proposed breakwaters could have a significant indirect effect on water quality due to impaired circulation. The installation of culverts or other flow-through systems in the breakwaters was recommended in order to reduce circulation problems. However, the Buffalo District has determined that such a system would have little effect in alleviating this impact. To address this potential problem, the Lorain Port Authority would be required to establish regulations prohibiting the discharge of pollutants into the harbor area.

The USF&WLS also recommended that water quality within the proposed small-boat harbor be monitored and remedial measures be undertaken if significant degradation of water quality occurs. If, after construction, significant water quality degradation occurs due to design deficiencies, the Corps of Engineers would investigate the problem.

UNRESOLVED ISSUES

There are no unresolved major disagreements among study area interests.

RELATIONSHIP TO ENVIRONMENTAL REQUIREMENTS

The final feasibility plans have been considered in relation to a number of Federal laws and policies as well as State laws, which have a bearing on the issues involved. Table EIS-1 presents a summary of environmental review and consultation requirements applicable to Corps Civil Works actions.

Table EIS 1 - Relationship of Plans to Environmental Protection Statutes and Other Environmental Requirements (Tentatively Selected Plan is Alternative Plan 5)

	Alternative 2	Alternative 5	Alternative 6
<u>Federal Statutes</u>			
Archaeological and Historic Preservation Act, as amended, 16 USC 469 <u>et seq.</u>	Full	Full	Full
Clean Air Act, as amended, 42 USC 7401, <u>et seq.</u>	Full	Full	Full
Clean Water Act, as amended (Federal Water Pollution Control Act), 33 USC 1251 <u>et seq.</u>	Full	Full	Full
Coastal Zone Management Act, as amended, 16 USC 1451 <u>et seq.</u>	Full	Full	Full
Endangered Species Act, as amended, 16 USC 1531 <u>et seq.</u>	Full	Full	Full
Estuary Protection Act, 16 USC 1221 <u>et seq.</u>	N/A	N/A	N/A
Federal Water Project Recreation Act, as amended, 16 USC 460-1(12) <u>et seq.</u>	Full	Full	Full
Fish and Wildlife Coordination Act, as amended, USC 661 <u>et seq.</u>	Full	Full	Full
Land and Water Conservation Fund Act, as amended, 16 USC 4601-4601-11 <u>et seq.</u>	Full	Full	Full
Marine Protection, Research and Sanctuaries Act, 22 USC 1401 <u>et seq.</u>	N/A	N/A	N/A
National Historic Preservation Act, as amended, 16 USC 470a <u>et seq.</u>	Full	Full	Full
National Environmental Policy Act, as amended, 42 USC 4321 <u>et seq.</u>	Full	Full	Full
Rivers and Harbors Act, 33 USC 401 <u>et seq.</u>	Full	Full	Full
Watershed Protection and Flood Prevention Act, 16 USC 1001 <u>et seq.</u>	N/A	N/A	N/A
Wild and Scenic Rivers Act, as amended, 16 USC 1271 <u>et seq.</u>	N/A	N/A	N/A
<u>Executive Orders, Memoranda, etc.</u>			
Flood Plain Management (EO 11988)	Full	Full	Full
Protection of Wetlands (EO 11990)	Full	Full	Full
Environmental Effects Abroad of Major Federal Actions (EO 12114)	N/A	N/A	N/A
Analysis of Impacts on Prime and Unique Farmlands (CEQ Memorandum, 30 Aug 76)	Full	Full	Full
<u>State and Local Policies</u>			
Section 401 Water Quality Certificate	Full	Full	Full
<u>Land Use Plans</u>			
U.S. Department of Agriculture - Soil Conservation Service	Full	Full	Full
U.S. Environmental Protection Agency	Full	Full	Full
U.S. Department of Housing and Urban Development	Full	Full	Full
U.S. Department of the Interior - Fish and Wildlife Service	Full	Full	Full
Ohio Department of Natural Resources	Full	Full	Full
Lorain County Planning Commission	Full	Full	Non-
Lorain City Planning Commission	Full	Full	compliance
			compliance

NOTES: The compliance categories used in this table were assigned based on the following definitions:

- Full Compliance - All requirements of the statute, EO, or other policy and related regulations for the current stage of planning.
- Partial Compliance - Some requirements of the statute, EO, or other policy and related regulations for the current stage of planning remain to be met.
- Noncompliance - None of the requirements of the statute, EO, or other policy and related regulations have been met.
- Not Applicable (N/A) - Statute, EO, or other policy not applicable.

DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR
RECREATIONAL NAVIGATION STUDY
AT LORAIN HARBOR
LUCAS COUNTY, OHIO

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1. NEED FOR AND OBJECTIVES OF ACTION

This chapter explains how and why the Corps of Engineers became involved in the study and what public concerns and consequent planning objectives were identified as the basis for plan formulation. It is presented in the following three discussions:

a. **Study Authority.** This discussion identifies the study's authorizing document and summarizes the Congressional intent for undertaking the study.

b. **Public Concerns.** This section describes the public concerns and related resource management needs (problems and opportunities) which were identified in the study.

c. **Planning Objectives.** This discussion states the planning objectives which were derived from the aforementioned resource management needs and employed in plan formulation.

1.1 Study Authority.

1.1.1 In response to a resolution by the Committee on Public Works and Transportation of the House of Representatives, dated 23 September 1976, a reconnaissance study was initiated to review Lorain Harbor needs. The resolution states:

"Resolved by the Committee on Public Works and Transportation of the House of Representatives, United States, that the Board of Engineers for Rivers and Harbors is hereby requested to review the report on Lorain Harbor, Ohio, published in House Document No. 166, 86th Congress, 1st Session, and other pertinent reports, with view of determining whether any modification to the recommendations contained therein is advisable at the present time, including consideration of the passage and safe navigation of new and larger ships operating on the Great Lakes."

1.1.2 The reconnaissance report, completed in January 1979, identified excess recreational boating and fishing demands at Lorain, OH, and recommended the study of potential resource improvements. Authorization for this final feasibility investigation thereby originated from the House resolution.

1.2 Public Concerns.

1.2.1 **Recreational Boating.** In its current condition, Lorain Harbor offers very little in recreational facilities for boaters who desire to use Lake Erie. The existing facilities consist of two relatively small marinas. One owned by the city, located near the mouth of the Black River, has a capacity for 70 boats. The other, privately owned, is located upriver across from American Steamship and has a capacity for only 23 boats.

1.2.2 The existing demand for additional permanent facilities is so great, that the Lorain Port Authority has recently constructed (August 1981) a temporary 600-foot floating tire breakwater in the East Basin of

Lorain's Outer Harbor. The breakwater project provides temporary single-point moorage space for about 36 small crafts. The floating breakwater project is expected to last 6 to 10 years.

1.2.3 The Port Authority of Lorain is extremely interested in an expanded small-boat harbor capacity. The Corps of Engineers has previously (1968) developed recommendations for a new small-boat harbor in the west basin at the foot of Brownell Avenue, but that improvement plan was discontinued from further investigation because of local opposition to project siting in the West Basin. Currently, local citizens interest groups, and institutions complain of immediate need for additional mooring locations. At the initial public workshop for this study on 5 November 1980, local boaters, fishermen, marina and marine supply proprietors, public officials, and citizens expressed their desires for a small-boat harbor at Lorain and requested that construction of this project be undertaken at the earliest possible date. These factors indicate a need for enlarged small-boat harbor capacity at Lorain, OH.

1.2.4 Public Safety. The 30-mile Lake Erie coast between Federally maintained Rocky River and Vermilion Harbors has two other privately maintained inlets - Beaver Creek and Avon Basin - that are not considered dependable harbors-of-refuge. Lorain Harbor currently functions as a small-boat harbor-of-refuge. However, boats seeking to escape dangerous lake conditions are inconvenienced by unavailability of appropriate docking space, conflicts with commercial ship traffic, and vertical clearance limitations at the Erie Avenue Bridge when closed. A new small-boat harbor could eliminate much of this functional inconvenience, and could improve the comfort and safety offered to boaters seeking refuge.

1.2.5 Recreational Fishing. As a result of comments at the initial public workshops and interviews with the Lorain Harbor master and president of a local fishing club, interest in land-based fishing improvements at Lorain was well-substantiated. The 1979 creel census conducted by the Ohio Department of Natural Resources has shown the most utilized shore facilities on Ohio's Lake Erie shore to be at Cleveland and Lorain.

1.2.6 U.S. Fish and Wildlife Service Concerns. The U.S. Fish and Wildlife Service (USF&WS) has noted that breakwater design as proposed in the various alternative plans would result in a reduction in water circulation in the area relative to existing conditions. If nutrient and waste loadings to Lorain Harbor from upstream industrial, municipal, and agricultural sources continue at approximately existing levels, water quality problems may develop in the proposed small-boat harbor during calm periods. USF&WS has stated that depressed dissolved oxygen levels would be one of the most serious potential water quality problems that could limit fish use of the small-boat harbor during calm periods.

1.2.7 In order to address this potential problem, USF&WS has recommended that:

a. The strict prohibition of the discharge of pollutants into the waters of the harbor be made a part of the Local Cooperation Agreement; and

b. Water quality within the small-boat harbor be monitored and remedial measures be undertaken to alleviate any further significant degradation of water quality that could occur as a result of the construction and operation of the harbor.

1.3 Planning Objectives.

1.3.1 Development of the various alternative plans for the proposed small-boat harbor at Lorain, OH, considered the national objectives for planning water resource projects as set forth in the U.S. Water Resource Council's "Principles and Standards for Planning Water and Related Land Resources." These two national objectives are:

1.3.2 National Economic Development (NED). National Economic Development is achieved by increasing the value of the nation's output of goods and services and improving economic efficiency. For the Lorain Recreational Navigation Study, the primary tangible benefits associated with the NED account are recreational navigation and fishing benefits. The NED Plan is based on the alternative which maximizes net benefits according to the 14 April 1980 Principles and Standards.

1.3.3 Environmental Quality (EQ). Environmental Quality is achieved by the management, conservation, preservation, creation, restoration, or improvement of the quality of certain natural and cultural resources and ecological systems.

1.3.4 Specific planning objectives were formulated to meet the national, State, and local water and related land management needs, opportunities and problems specific to the study area that relate to NED and EQ. The Buffalo District has established the following planning objectives to guide the formulation of a plan of improvement for the Lorain Harbor recreational navigation study:

a. To increase mooring facilities for shallow draft recreational craft at Lorain Harbor.

b. To improve Lorain Harbor as a harbor-of-refuge for light draft recreational craft.

c. To increase the quantity of sites available for land based fishings at Lorain Harbor.

d. To preserve cultural resources in Lorain Harbor which would contribute toward protecting a part of the heritage of Lorain County.

e. To preserve, protect or enhance the quality of fish and wildlife where possible in Lorain Harbor.

f. To provide safe trafficking for the mix of commercial and recreational boats using Lorain Harbor.

2. ALTERNATIVES

This chapter identifies and describes all reasonable and feasible alternatives considered, and assesses and evaluates the most responsive solutions (detailed plans). It is presented in the following four discussions:

a. Plans Eliminated from Further Study. This discussion describes each plan considered in late preliminary feasibility planning, but not included in the final array of alternatives, and the rationale for eliminating such plans.

b. Without Conditions (No Action). This section describes the without conditions that are expected to occur in the absence of any Federal action to address the planning objectives. Non-Federal actions to address the planning objectives are described and the agency(ies) or group(s) responsible for their implementation and any mitigation requirements of such actions are identified.

c. Plans Considered in Detail. This section describes each plan included in the final array of alternatives. It summarizes each plan description, implementation responsibilities, and any mitigation requirements. The designated NED and EQ Plans, and the tentatively Selected Plan are identified.

d. Comparative Impacts of Alternatives. This section describes, in comparative form, the base and without project condition, the impacts of the detailed plans on significant resources, and plan economic characteristics (i.e., total costs, net benefits, benefit-to-cost ratio). This information is presented in Table EIS-2, page EIS-20 (The Environmental Effects section (p. EIS-28) contains a detailed analysis of the environmental consequences of each alternative and provides backup analysis for the comparative table).

2.1 Plans Eliminated from Further Study.

2.1.1 Alternative Sites. A total of five potential small-boat harbor sites were identified during the site selection phase of the preliminary feasibility study. Additionally, opportunities for nonstructural solutions were researched. The five sites varied in location and characteristics. General site locations included the Black River (Inner Harbor), the east and west basins of the Outer Harbor, the open coast, and a stream mouth remote from the commercial harbor (Beaver Creek). This latter location was added as a direct result of comments at an Orientation Workshop; even though the original study limits required expansion to include this type of geographical environment. The five site locations are depicted in Figure 3 of the Main Report. The nonstructural alternative would be located on lands adjacent to the Municipal Pier.

a. Alternative Site No. 2 - East of Diked Disposal Area. The conceptual plan at this site makes use of future lands created by the Diked Disposal Area (see Plate 2 of the Main Report). Fifteen acres of land support facilities would be placed on the filled area and along the southern edge of the 600-slip berthing area. Two shore-connected breakwaters

measuring 1,000 feet and 700 feet in length, would be necessary to diminish the effects of the open-lake wave forces. The westerly edge of the basin would be faced with large rock riprap. The southerly edge would require construction of a low bulkhead to create land facility areas by the disposal of nearshore dredged material.

Since this site is located completely outside of existing harbor structures and there would be no barrier between the open-lake waters and the small-boat harbor breakwaters, costs would be greatly escalated by the relatively massive protection requirements. Breakwater heights and armor rock needs would be increased. Also, water depths are greater here and breakwaters would be comparatively longer. For these reasons, Site No. 2 was eliminated from further study.

b. Alternative Site No. 3 - Inside West Breakwater. The conceptual small-boat harbor layout at this site features a 15-acre land and a 30-acre water area with a capacity for 425 berths (see Plate 3 of the Main Report). Major structural elements of this plan include elevation of the West Breakwater to prevent wave overtopping, and construction of a bulkhead along the northern edge of the large land facility area located next to the West Breakwater. Nearly the entire berthing area would be dredged, with disposal occurring behind the new bulkhead to raise land areas there.

This site location would interfere with commercial operations, most notably the infringement upon lands used by the Ohio Edison Company. Also, this water area is heavily used by sport fishermen, both from shore and boat. Local opposition to construction of a small-boat harbor at this site resulted in the discontinuation of its study.

c. Alternative Site No. 4 - Black River at 21st Street Bridge. The features of this site plan included a single, 1,500-foot long breakwater, a 20-acre water area for 400-boat slips, and a 20-acre land area (see Plate 4 of the Main Report). The water area, characterized as a wetland, would be dredged to project depths. The adjacent commercial channel would be widened into the opposite river bank.

Access to land facilities would be hampered by surrounding high bluffs. Steep road grades would be considered as a detriment, especially for boat trailering. The water access route to Lake Erie would traverse a lengthy portion of Inner Harbor commercial channels and would pass under the Erie Avenue bascule bridge. Additional water use conflicts may be created by the boat basin's infringement upon an existing turning basin. The destruction of the 21st Street wetlands is considered to be a serious environmental impact of this plan. For these reasons, Alternative Site No. 4 was eliminated from further study.

d. Alternative Site No. 5 - Beaver Creek. Within the city limits of Lorain, this site is characterized as a low-lying area at the mouth of Beaver Creek, approximately 2 miles west of the Black River (see Plate 5 of the Main Report). This plan involved the construction of a 2,900-foot shore-connected breakwater, a 1,200-foot riprap wall, and bulkheading of land facility areas. Dredging would also be required for this 600-boat marina.

The projection of a breakwater far lakeward would likely cause erosional problems at adjacent shores adversely affecting railroad uses in the area. Sedimentation within the boat basin would occur since the creek would empty into quiet harbor areas. Even though existing land uses include private marinas, natural habitat areas are relatively valuable, with some characterized as wetlands or transition zones. This alternative was also the most costly. For these reasons, Alternative Site No. 5 was eliminated from further consideration.

e. Alternative Site No. 6 - Nonstructural. This alternative involves a new dry-storage facility at the existing Municipal Pier launch ramps in conjunction with preferential use by large motorboats and sailboats of the existing public Yacht Basin at the Black River mouth. The dry-storage facility would be located on public land areas and was envisioned as including a modern, automated-type launching apparatus within an enclosed building containing stacked motorboats about 22 feet in length. Total dry-storage capacity would be 400 boats (see Plate 6 of the Main Report).

Very low implementation costs would be offset by several functional disadvantages. The facility would limit the fleet mix which could be accommodated and would present inconveniences to users. During peak use periods, excess demand would be probable for launching activities. This is also a potential source of problems during inclement weather when convergence on the facility would hamper its effectiveness as a harbor-of-refuge. The storage and launch facility would encroach upon adjacent commercial and recreational uses. Some land used by the Ohio Edison Company would be needed to acquire adequate space for parking and structures. The Municipal Pier is heavily used as a land-based sport fishing facility. Increased boating activity may restrict continuation of recreational fishing at this site. In general, the exclusion of wet slips for dry-storage improvements is not preferable to most recreational boaters, and potential enhancements of associated recreation activities would be lost. For these reasons, Alternative Site No. 6 was eliminated from further study.

2.1.2 Comparisons of the six possible sites for improving small-boating conditions at Lorain, indicated the relative advantages of developing preliminary harbor plans at the Site 1 location inside the East Breakwater. This site demonstrated the greatest potential for meeting the planning objectives.

2.1.3 Subsequent to the selection of a harbor site, a total of five preliminary harbor plans were developed. The following alternative plans for a small-boat harbor at Site 1 which have been eliminated from further study are (For a more detailed description, see pp 23-25 of the Main Report.):

a. Alternative 1 - 300 Slips Without Riverside Park Cut. The primary features of this plan included:

- . 300-slip capacity
- . 900-foot East Breakwater
- . 200-foot West Breakwater
- . Recreational fishing facilities (handrail and concrete walkway) on both breakwaters.

Boating demand analysis indicated that a 600-slip marina is preferable to a smaller sized one. Since the total cost differential between Alternative 1 (300 slips) and Alternative 2 (600 slips) is slight, the obvious choice was to select Alternative 2 over Alternative 1 for detailed study. Therefore, Alternative 1 has been eliminated from further consideration.

b. Alternative 3 - 300 Slips with Riverside Park Cut. This harbor concept assumed a commercial navigation channel cut through Riverside Park. The primary features of this plan included:

- . 300-slip capacity
- . 1,500-foot West Breakwater
- . 500-foot North Breakwater
- . Recreational fishing facilities (walkway and handrail) on North Breakwater

As previously stated, boating demand analysis indicated that a 600-slip marina is preferable to a smaller one. Also, the Lorain Commercial Navigation Study has eliminated the plan for a channel cut through Riverside Park. For these reasons, Alternative 3 has been eliminated from further study.

c. Alternative 4 - 600 Slips with Riverside Park Cut. This alternative also assumed a commercial navigation channel cut through Riverside Park. The primary features of this plan included:

- . 300-slip capacity
- . Dry storage facilities for 300 boats
- . 1,500-foot West Breakwater
- . 500-foot North Breakwater
- . Recreational fishing facilities (walkway and handrail) on North Breakwater.

2.1.20 As stated above, the possibility of a commercial channel cut through Riverside Park has been eliminated from further consideration; therefore, Alternative 4 has also been eliminated.

2.2 Without Conditions (No Action).

2.2.1 Population is projected to increase in Lorain County. This is expected to put increased pressures upon existing recreational facilities. Boating and fishing facilities presently are at capacity according to the Lorain Port Authority. The city of Lorain is interested in relieving some of the stress, but apparently lacks sufficient funding abilities to undertake any but temporary measures to create any increased small-boat moorings (i.e., the floating breakwater described previously in this section).

2.2.2 Significant expansion of existing marinas at Lorain is restricted by either land and water ownership conflicts or by physical limitations. Marinas within Lorain Harbor, notably the Lorain Yacht Basin and Seaway Marina, have fully utilized available land and water areas. Acquisition of adjacent areas is unrealistic due to commercial valuations or public facility

uses (sewage treatment plant, U.S. Coast Guard Station, industrial development, and commercial ship channel). To the west of the harbor, marinas on Beaver Creek have some areas available for expansion, but these areas are inland and require water access under a railroad bridge and a highway bridge with vertical clearance of about 5 feet. Therefore, the type of vessels using these facilities generally is limited to trailerable powerboats. Also, major expenditures are required before this area could have an all-weather entrance.

2.2.3 Without Federal cooperation, conditions would remain essentially unchanged from present conditions. Marine related businesses and small-boat industries would not grow appreciably. Local and regional recreational use of Lake Erie would not increase to its fuller resource potential.

2.2.4 Individuals would pursue nonwater related recreation or would experience objectionable crowding conditions. Boaters would purchase small trailerable boats even if larger nontrailerable boats were preferred. Still, convenience of launching would limit this activity.

2.2.5 Regional boating and fishing facilities would not accommodate demand transfer from Lorain, since these facilities also would experience capacity usage. In general, an opportunity for appropriate and desirable recreational use of Lake Erie at Lorain may be missed.

2.3 Plans Considered in Detail.

2.3.1 Alternative Site 1 - Inside East Breakwater. The selected site for the proposed small-boat harbor encompasses a water area of 38 acres and a land area of 23 acres (see Figure EIS-1). The existing system of breakwaters produces relatively quiescent waters here, thereby reducing the mass and height requirements for new structures to protect the proposed small-boat basin. The basin shape is nearly rectangular and has sufficient depth to eliminate the need for dredging. The easterly and westerly edges of the basin are protected by steel sheet piling. The southerly edge is composed of a gravel and cobble shore. These basin characteristics are conducive to cost savings and efficient use of land/water areas. Marina parking would be conveniently located along one side of the geometrically favorable berthing area. The land support facilities would be placed upon a portion of the Diked Disposal Area, with remaining portions planned as a city park. The park's completion is scheduled to be approximately concurrent with construction of the small-boat harbor. A marina should complement the overall water-oriented theme of the park. Major street systems are within close proximity and no major environmental problems are anticipated at this site.

2.3.2 Of the six sites evaluated, Alternative Site 1 possesses overall superiority and excellent potential for implementation. The site exhibits responsiveness to all evaluation criteria-engineering, economic, environmental, and social. Local support for this site is evident from city and Port Authority decisions to create an "interim" temporary marina there.

2.3.3 Alternative 2 - 600 Slips Without Riverside Park Cut. Alternative 2 would provide an all-weather small-boat harbor with a 600-slip capacity. Figure EIS-1 displays the harbor layout and project features for Alternative 2.

2.3.4 A single rubblemound breakwater, 1,500 feet in length, would bound the northerly edge of the basin area inside the existing shore-connected East Breakwater. Approximately 6,700 cubic yards of nearby lake sediments would be dredged and used to fill depressions to give the breakwater a flat foundation. Figure EIS-1 also shows a typical breakwater cross section.

2.3.5 The new breakwater would have a crest height of 8 feet above LWD. It would protect a water area of about 40 acres which would provide ample space for wide entrance and interior channels, fairways, slips, three launch ramps, and public docks. The 225-foot wide entrance channel would open onto the existing commercial channel at a location just outside the Inner Harbor. This would aggravate potential vessel traffic congestion, but seems acceptable to the Lorain Port Authority.

2.3.6 Alternative 2 would make full and efficient use of available land and water geometry. Land support facilities would extend along the eastern basin boundary (on the Diked Disposal Area). The Diked Disposal Area is expected to be filled in about 10 more years and should support low density loading. Total project land area of 14 acres would be accessed via Colorado Avenue.

2.3.7 Existing water depths range from 6 to 18 feet below LWD and eliminate dredging requirements. The southerly shore would be the "natural" gravel and cobble beach which would be further stabilized by the new East Breakwaters. The rubblemound breakwater and beach would likely attenuate energy reverberations within the basin.

2.3.8 Land-based recreational fishing facilities would include a handrail and a 4-foot wide concrete cap on the 10.5-foot wide breakwater crest.

2.3.9 Mitigation Requirements. As an item of local cooperation, the Lorain Port Authority would be required to establish regulations prohibiting the discharge of pollutants into the harbor area. The USFWS has recommended that if significant water quality degradation occurs as a result of reduced water circulation within the small-boat harbor, remedial measures should be investigated further.

2.3.10 Implementation Responsibilities. The Federal Government (Corps of Engineers) would be responsible for 50 percent of the total project costs for the following items: breakwater, fisherman walkway and handrail; engineering and design; and supervision and administration. The Local Cooperator (Lorain Port Authority) would be responsible for the other 50 percent of these costs. The Port Authority would also be responsible for 100 percent of the costs of all lands and damages. The U.S. Coast Guard would be responsible for 100 percent of the costs of navigation aids on the breakwater.



2.3.11 Since this plan would maximize net annual benefits (\$1,452,900), it has been designated as the NED Plan.

2.3.12 Alternative 5 - 600 Slips (Detached Breakwater). Alternative 5 would provide an all-weather recreational harbor with a 600-slip capacity. The project features and harbor layout for Alternative 5 are depicted in Figure EIS-3.

2.3.13 Alternative 5 essentially is an alteration of Alternative 2, except the detached breakwater concept would allow a separation of recreational and commercial traffic at the marina entrance. A 175-foot wide waterway between the easterly end of the detached breakwater and the westerly end of the main breakwater would provide this separated entrance. This reorientation of breakwaters (relative to Alternative 2) would reduce the water area for mooring and interior channels, but sufficient area would remain for 600 slips and all access channels. All other features, land and water; would be similar to Alternative 2, including an alternate entrance directly connected to the existing commercial channel. Rubblemound breakwater crests would be 8 feet above LWD, and dredging would remain unnecessary.

2.3.14 Recreational fishing would be limited to the 800-foot main breakwater which would be connected to the Diked Disposal Area. The breakwater would feature a 10.5-foot wide crest where fisherman walkways would be provided.

2.3.15 Mitigation Requirements. As an item of local cooperation, the Lorain Port Authority would be required to establish regulations prohibiting the discharge of pollutants into the harbor area. The USFWS has recommended that if significant water quality degradation occurs as a result of reduced water circulation within the small-boat harbor, remedial measures should be investigated further.

2.3.16 Implementation Responsibilities. The Federal Government (Corps of Engineers) would be responsible for 50 percent of the total project costs for the following items: breakwaters, fisherman walkway and handrail; engineering and design; and supervision and administration. The Local Cooperator (Lorain Port Authority) would be responsible for the other 50 percent of these costs. The Port Authority would also be responsible for 100 percent of the costs of all land and damages. The U.S. Coast Guard would be responsible for 100 percent of the costs of navigation aids on the breakwaters.

2.3.17 The differences in environmental impacts between Alternative 2 and 5 are slight. Nevertheless, some features of Alternative 5 may make it comparatively less damaging to the natural environment than Alternative 2. Alternative 5 provides a greater surface area of rocky benthic habitat (1.7 vs. 1.6) which could benefit local fish and bottom-dwelling species. Also, the northeast harbor outlet may slightly lessen water stagnation problems in the proposed harbor. For these reasons, Alternative 5 may be the least environmentally damaging plan.

Table EIS-2 - Comparative Impacts of Alternatives (Alternative 5 is the Tentatively Selected Plan)

Base Condition and Alternatives	Recreation	Transportation	Public Utilities and Services	Water Quality	Aquatic Habitat	Plan Economics
Base Condition						
Recreational Boating (20-Mile Radius)	Adequate for current use by local residents, boaters, and visitors to the project.		Lorain Harbor can function as a harbor-of-refuge.		Approximately 70 acres of undredged bottom habitat protected from significant wave action. 2,323 lineal feet of steel sheet pile.	Not applicable
Short-based Sport Fishing (Lorain Harbor)	352 dry slips		Boats are interconnected by a shortage of docking space. Conflicts with commercial traffic and vertical clearance limitations.		East Breakwater Shorearm: 134 lineal feet concrete; 950 lineal feet of steel sheet pile (bulkhead of peninsula); and 1,100 lineal feet of gravel and cobbleshore.	
Alternative 2 (1,500-foot Breakwater)						
Recreational Boating	Increase in local traffic	Increase in local demands.	Increase in Lorain's capacity as a harbor-of-refuge. Elimination of congestion problems associated with the Black River facility.	Temporary turbidity; possible spills of fuel, oil & grease during construction. Possible spills of oil, fuel & sewage from boats and fuel dock facilities.	Introduction of 1,150 lineal feet (1.6 acres) of rocky substrate (rubblemound breakwater) resulting in an increase in habitat diversity. 2.2: Interruption of existing circulation patterns as a result of breakwater construction.	Investment Costs: \$3,450,000 Average Annual Costs: \$382,300 Net Benefits: \$1,452,900 B/C Ratio: 3.80
Short-based Sport Fishing	352 dry slips					
Available: 2,445 wet slips						
Impact: +600 wet slips						
Recreational Boating	Increase in local traffic	Increase in local demands.	Increase in Lorain's capacity as a harbor-of-refuge. Elimination of congestion problems associated with the Black River facility.	Temporary turbidity; possible spills of fuel, oil & grease during construction. Possible spills of oil, fuel & sewage from boats and fuel dock facilities.	Introduction of 1,150 lineal feet (1.6 acres) of rocky substrate (rubblemound breakwater) resulting in an increase in habitat diversity. 2.2: Interruption of existing circulation patterns as a result of breakwater construction.	Investment Costs: \$3,450,000 Average Annual Costs: \$382,300 Net Benefits: \$1,452,900 B/C Ratio: 3.80
Short-based Sport Fishing	352 dry slips					
Available: 2,445 wet slips						
Impact: +600 wet slips						
Alternative 5 (800-foot Breakwater and 425-foot Detached Breakwater)						
Recreational Boating	Increase in local traffic	Increase in local demands.	Increase in Lorain's capacity as a harbor-of-refuge. Elimination of congestion problems associated with the Black River facility.	Temporary turbidity; possible spills of fuel, oil & grease during construction. Possible spills of oil, fuel & sewage from boats and fuel dock facilities.	Introduction of 1,150 lineal feet (1.6 acres) of rocky substrate (rubblemound breakwater) resulting in an increase in habitat diversity. 2.2: Interruption of existing circulation patterns as a result of breakwater construction.	Investment Costs: \$3,450,000 Average Annual Costs: \$382,300 Net Benefits: \$1,452,900 B/C Ratio: 3.80
Short-based Sport Fishing	352 dry slips					
Available: 2,445 wet slips						
Impact: +600 wet slips						
Alternative 6 (No Action)						
Recreational Boating	Increase in local traffic	Increase in local demands.	Increase in Lorain's capacity as a harbor-of-refuge. Elimination of congestion problems associated with the Black River facility.	Temporary turbidity; possible spills of fuel, oil & grease during construction. Possible spills of oil, fuel & sewage from boats and fuel dock facilities.	Introduction of 1,150 lineal feet (1.6 acres) of rocky substrate (rubblemound breakwater) resulting in an increase in habitat diversity. 2.2: Interruption of existing circulation patterns as a result of breakwater construction.	Investment Costs: \$3,450,000 Average Annual Costs: \$382,300 Net Benefits: \$1,452,900 B/C Ratio: 3.80
Short-based Sport Fishing	352 dry slips					
Available: 2,445 wet slips						
Impact: +600 wet slips						

2.3.18 Alternative Plan 6 - No Action. The No-Action Plan provides the basis for evaluating the structural alternatives. This option, although not favored by the Lorain Port Authority, avoids the monetary investment and adverse environmental impacts associated with the structural plans. The No-Action Plan would not meet the recreational boating and fishing needs identified for the Lorain area. Problems discussed earlier in this report would remain unchanged and unresolved. The No-Action Plan would not fully meet the planning objectives as stated in paragraph 1.3.4. Non-Federal actions to address these objectives include proposed park development at the Diked Disposal Area (shore fishing) and the temporary floating breakwater project (recreational boating).

2.3.19 Tentatively Selected Plan. The most economical plan is to develop a small-boat harbor for the greatest number of boats possible. However, since both plans make efficient use of the water area, the primary trade-off is the slight increase in water area versus the added safety of a dual entrance (Alternative 2 vs. 5). Because the boating season is constrained by seasonal variations and the climatic conditions on Lake Erie can change quickly, the Buffalo District has concluded that the advantages of an additional entrance outweigh the benefits of a slightly larger marina. Therefore, Alternative 5 has been designated the tentatively Selected Plan. However, because of the significant investments required by the Lorain Port Authority to construct either plan, their recommendations during the public review of this report will be given utmost consideration before submittal of the final report's recommendations.

3. AFFECTED ENVIRONMENT

This chapter describes the study area's existing and without conditions in the following discussions:

a. Environmental Conditions. This discussion describes the major characteristics of the study area's natural and human resources to provide a general understanding of physical, ecological, social, cultural, and economic conditions.

b. Significant Resources. This section describes each significant resource included in the Comparative Impacts of Alternatives table (p. EIS-20), including its location, quantity, and quality. In further identifying and characterizing resources, consideration is also given to the following criteria for resource significance:

(1) Resources identified in the laws, regulations, guidelines, or other institutional standards of national, regional, and local public agencies. Resources identified in the guidelines of certain private groups were also considered.

(2) Resources meeting certain study-specific technical criteria for measuring characteristics that may be critical to resource existence. Technical criteria include, but are not limited to, measurement of resource scarcity, fragility, resiliency, reproducibility, and tolerance.

(3) Resources specifically identified as a concern by public interests.

(4) Resources which, if affected by a plan, would violate an institutional standard, meet a study-specified technical criterion, or become the subject of public concern.

3.1 Environmental Conditions.

3.1.1 The city of Lorain is located along the south shore of Lake Erie in north central Ohio (see Figure EIS-3). The Black River flows through the city and empties into Lake Erie at the site of the Port of Lorain. The city is within Lorain County and is 27 miles west of Cleveland. The small-boat harbor site is bounded on the northeast side by the 2,323-foot East Breakwater Shorearm which is constructed of steel sheet pile cells filled with granular material and capped with concrete. The nearshore end of the East Breakwater Shorearm is connected to the shoreline by a 134-foot concrete block shore connection. The 1,100-foot shoreline which parallels Lakeside Avenue is a moderately sloping area of gravel and cobble. Extending northwest from this shoreline and separating the southeast area of the Outer Harbor from the Black River is a steel sheet pile bulkheaded peninsula containing the Lorain Water Pollution Control Plant, the U.S. Coast Guard Station, and Riverside Park. The northeast portion of the peninsula has some large riprap protection along the shoreline.

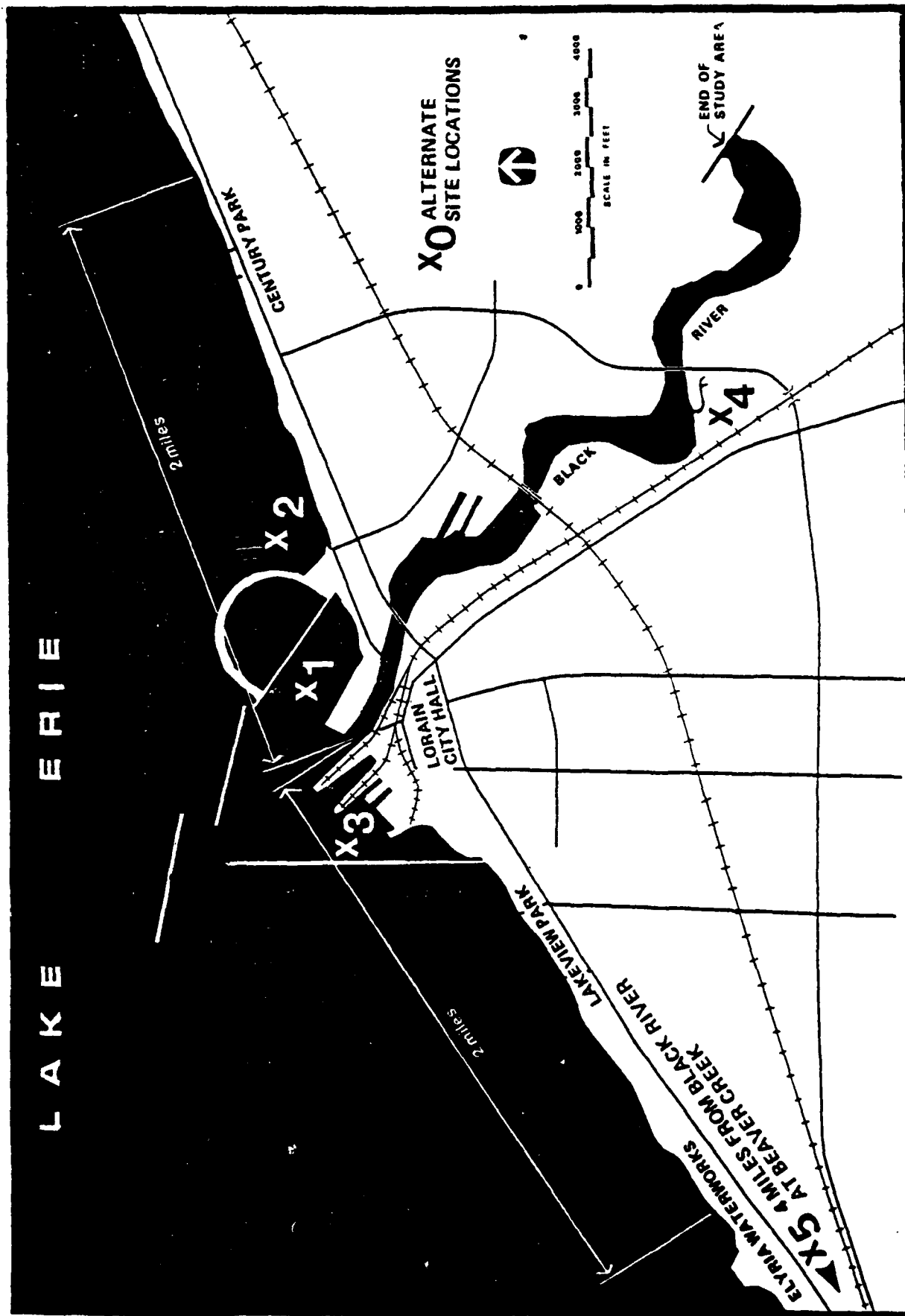


Figure EIS-3
ALTERNATE SITE LOCATIONS

3.1.2 Land use patterns reflect the industrial-commercial nature of this lake port community. The banks of the Black River and the lakefront at the entrance to the harbor are characterized by high intensity industrial and related transportation uses, commercial docking facilities, utility uses, and recreation use activities. There remains, however, a significant amount of vacant or unused land available for industrial development along the 3-mile navigation channel.

3.1.3 The population of Lorain County in 1980 was 274,909, up from 256,843 in 1970. The population of the city of Lorain in 1980 was 75,416 down from 78,185 in 1970. The average unemployment rate in 1981 for Lorain county was 13.3 percent. Lorain County unemployment currently exceeds 20 percent. Manufacturing plays a major role in Lorain's economy and in 1978, 40,997 people or 38.6 percent of the labor force was employed by the 55 diversified manufacturing industries in the area. Principal industries in the Lorain area include steel, shipbuilding, and automobiles.

3.1.4 Lorain Harbor is located on the eastern edge of the Mississippi flyway and the western edge of the Atlantic flyway, thus attracting large numbers of ducks, geese, and swan, which pass through the area on migratory flights between southern wintering grounds and northern breeding grounds. The Outer Harbor provides good feeding habitat for many species of diving ducks including mergansers and scaup. The only abundant dabbling duck is the mallard. Herring gulls, ring-billed gulls, and Bonaparte's gulls are also attracted to the Outer Harbor. No significant amount of waterfowl breeding occurs in either the Outer Harbor or the lower reaches of the Black River.

3.1.5 The proposed project lies within the range of a Federally listed endangered species, the Indiana bat (*Myotis sodalis*). The study area was inspected by a biologist of the U. S. Fish and Wildlife Service and it was determined that no suitable habitat for endangered species existed. Coordination with the Ohio Department of Natural Resources has revealed no State-listed threatened or endangered species or critical habitat within the study area.

3.1.6 Based on a cultural resources report completed for the area in 1975 entitled: Inventory of Cultural Resources: Diked Disposal Site No. 7, Lorain Harbor, Ohio, by Dr. Don Dragoo, and correspondence with the Ohio Historic Preservation Office, the Regional Archaeological Preservation Office, and the National Park Service (see Appendix C), there are no potentially significant historic properties or archaeological sites which would be impacted by any of the proposed alternatives.

3.1.7 The Buffalo District contracted for sediment testing of areas within the limits of the proposed small-boat harbor during 1981. Sediment samples were collected on 24 November 1981 by Environmental Resource Associates, University Heights, OH, and shipped to EG&G Bionomics, Wareham, MA, for bulk chemical analysis (The report of results, entitled Bulk Chemical Analysis of Sediment Samples Collected from Lorain Harbor, OH, is available from the Buffalo District on request). Sample sites C and D, as illustrated on Figure EIS-2, were the only sites within the proposed project area. The samples were subjected to trace metal and inorganic analysis. In addition, they

were analyzed for the following organic parameters: Mirex; DDT; Chlordane; Aldrin/Dieldrin; Endrin; Heptachlor; Heptachlor Epoxide; Lindane; Toxaphene; and PCB's. Table EIS-3 gives the results for the tested parameters and compares them to Region V, USEPA pollutional criteria for sediments dredged from Great Lakes harbors. None of the organic compounds were found at the limits of detection used in the analysis.

3.1.8. Based upon the test results, Sites C and D are highly polluted with arsenic, iron, and manganese and have very high levels of total kjeldahl nitrogen. Site C is highly polluted with zinc and moderately polluted with chromium, copper, lead, nickel, and oil and grease. Site D is moderately polluted with nickel and zinc. Other parameters were found at unpolluted levels or have no USEPA pollutional criteria. On an overall basis (i.e. sediment quality and nature of the fill activity), it does not appear that the sediments are severely polluted which would prevent their use as lake bottom fill material for the construction of the proposed breakwaters.

3.2 Significant Resources.

3.2.1 Recreation. Lake-related leisure time activities are an important element in Lorain's recreational pursuits. Pleasure boating, fishing, swimming, walking, and running activities are commonly observed on or near the lakeshore. A shortage of fishing piers open to the public exists in the area. As a result, a number of structures such as the Diked Disposal Area and groins located in Century Park east of Lorain Harbor are being utilized by the general public. Residents also use privately owned and built seawall structures for fishing. Most of these structures are also used by the public to observe harbor and lake activities, as well as for duck hunting.

Table EIS-3 - Sediment Sampling
Results, Lorain Small-Boat Harbor

Parameter(1)	EPA Classification			Results	
	Unpolluted	Moderately Polluted	Highly Polluted	Site C	Site D
TRACE METALS					
Arsenic	<3	3-8	>8	17	12
Cadmium	-	-	>6	5.1	3.6
Chromium	<25	25-75	>75	33	16
Copper	<25	25-50	>50	43	23
Iron	<17,000	17,000-25,000	>25,000	44,000	34,000
Lead	<40	40-60	>60	48	25
Manganese	<300	300-500	>500	720	500
Mercury	<1.0		>1.0	0.11	0.058
Nickel	<20	20-50	>50	41	22
Zinc	<50	50-200	>200	250	160
INORGANICS					
Percent Solids (%)				70.00	75.85
Volatile Solids (%)	<5	5-8	>8	2.82	1.70
Ammonia				12.1	10.9
COD	<40,000	40,000-80,000	>80,000	27,300	85,300
Phenols				1.1	<0.25
Total Cyanide				<0.60	<0.49
Total Phosphorus				1530	766
Oil & Grease	<1,000	1,000-2,000	>2,000	1,020	472
Total Kjeldahl Nitrogen	<1,000	1,000-2,000	>2,000	20,660	15,290

(1) All values reported as mg/kg unless otherwise indicated.

3.2.2 In 1981, the sport fish harvest of shore fishermen in Lorain Harbor consisted primarily of white bass, yellow perch, freshwater drum, channel catfish, and walleye. The best sport fishing periods are in late spring (May-June) and early fall (September-October). Most of the fishing is done from boats from one-half to 5 miles offshore, although some fish are caught from the breakwaters around the harbor. As mentioned previously, there currently exists an excess demand for shore fishing opportunities within the Lorain Harbor area (see para. 1.2.6-1.2.9).

3.2.3 The harbor area includes two recreational boating marinas. The city-owned Lorain Yacht Basin, located on the Black River between the city's Water Pollution Control Plant and the U.S. Coast Guard Station, has a berthing capacity of 70 boats. Further upstream, adjacent to the Erie Sand and Gravel facility and below the N&W Railway Bridge, Seaway Marina has a berthing capacity of 23 boats. Due to the limited berthing capacity available at Lorain, trailering has been necessary. As a temporary measure, the city of Lorain has placed a floating rubber tire breakwater inside the East Breakwater which allows the mooring of 36 boats.

3.2.4 In 1980, 5,332 Lake Erie boats were registered in Lorain County, an increase of 4.2 percent since 1970. According to interviews with marina operators, the composition of the fleet mix has changed in the last 5 years. The fleet mix in Lorain County is becoming increasingly characterized by 16- to 25-foot outboards and auxillary powered sailboats. The larger outboard craft used in walleye fishing are now locating outside of Lorain County, in marinas closer to preferred fishing sites in western Lake Erie. One explanation for this shift is the higher cost of large power boat propulsion as compared to land travel.

3.2.5 Concurrently, there is increased sailing and small fishing craft activity in Lorain County, originating particularly from the Lorain Yacht Basin area. Although most of the local fishing involves small inboard and outboard craft that are frequently trailered, increasing numbers of auxillary powered sailboats and smaller, nonauxillary powered sailboats are creating excess demand for facilities.

3.2.6 Transportation. Lorain Harbor is a deep-draft commercial harbor serving the Port of Lorain which is almost exclusively a bulk cargo commercial port. Over a 10-year period (1969-1978), waterborne commerce at Lorain averaged 8,561,662 tons annually with peak volumes of 10,173,023 tons in 1972 and 11,584,368 tons in 1973. Waterborne commerce at Lorain in 1980 totaled 8,151,400 tons consisting principally of iron ore and concentrates, and limestone.

3.2.7 Any recreational harbor improvements are constrained by existing or planned commercial uses of Lorain Harbor. The desire to promote viable commercial uses in priority over recreational uses has been indicated by the Lorain Port Authority. Therefore, any small-boat harbor improvements must, to the greatest extent possible, allow for the efficient merging of recreational traffic with existing commercial traffic and consider proposed commercial improvements as described in the Lorain Harbor Commercial Navigation Study Final Feasibility Report (March 1983).

3.2.8 Street access to Alternative Site No. 1 would be primarily through Colorado and Lakeside Avenues. The existing streets that would service the site are not programmed for any widening, but in the opinion of the Lorain City Engineer, can accommodate any additional traffic generated by the proposed small-boat harbor.

3.2.9 Public Utilities and Services. Water supply for the city of Lorain is obtained from Lake Erie. Mains, which range from 4 to 24 inches, serve the city from a water works located in the West Harbor area.

3.2.10 Lorain has separate sanitary and storm wastewater collection systems. Sanitary effluent outfalls into Lake Erie subsequent to exiting a secondary treatment facility on the East Pier. Some tertiary treatment for phosphates also occurs. The city of Lorain Utilities Department has indicated that the existing sewage treatment facility has sufficient capacity to handle the additional wastewater created if a small-boat harbor is constructed in the area.

3.2.11 Electric power is provided by the Ohio Edison Company, with most of the power network built above ground. Natural gas is available through Columbia Natural Gas of Ohio. The Lorain Telephone Company provides telephone service to residents of the city of Lorain.

3.2.12 A study by the city of Lorain Department of Public Services regarding the city's streets and emergency and public services including police, fire, ambulance, utilities, water and sanitation indicated that the existing facilities and services are capable of accommodating any increased demands which would result from the construction of a small-boat harbor.

3.2.13 Public Health and Safety. Lorain Harbor currently functions as a small-boat harbor-of-refuge. However, boats seeking to escape dangerous lake conditions are inconvenienced by the unavailability of appropriate docking space, conflicts with commercial ship traffic, and vertical clearance limitations at the Erie Avenue Bridge when closed.

3.2.14 Water Quality. The U.S. Environmental Protection Agency (EPA) conducted numerous water quality surveys in the Black River Basin from 1972 to 1979. An intensive survey of the lower Black River was completed from 16-19 July 1979 and included most of the sampling points employed in 23-26 July 1974 intensive surveys. Since there were no significant differences in waste treatment at the Elyria Sewage Treatment Plant (STP), located 11 miles upstream, and U.S. Steel, the stream quality data obtained in 1979 were quite similar to those obtained in 1974.

3.2.15 Major findings of the survey include:

a. There were 159 known point-source dischargers within the Black River planning area, including 114 public and semi-public sewage treatment plants, 38 industrial facilities, and 7 water treatment plants. Four facilities discharged directly into Lake Erie, 127 discharged to streams with water quality design flows of zero cubic feet per second (cfs), and 28 discharged

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LORAIN SMALL-BOAT HARBOR LORAIN OHIO VOLUME II MAIN
REPORT AND DRAFT ENVIRONMENTAL IMPACT STATEMENT(U)
CORPS OF ENGINEERS BUFFALO NY BUFFALO DISTRICT MAY 83

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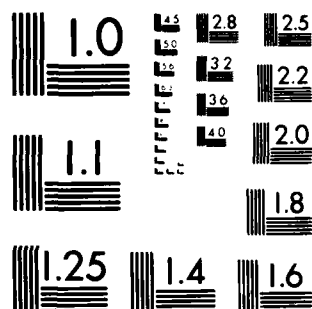
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

to lake-affected areas of the Black River or to streams having a significant water quality design flow.

b. Upstream of Elyria, most streams had good quality water and were in substantial compliance with Ohio water quality standards. Violations of the cadmium and lead standards were found at several locations, apparently the result of agricultural non-point source pollution. Bacterial standards were exceeded throughout the basin due to the discharge of inadequately disinfected sanitary wastes.

c. Large discharges of ammonia and other oxygen-demanding materials from the Elyria STP cause continuing and substantial violations of Ohio Water Quality Standards for ammonia and dissolved oxygen in the main stem of the Black River. Thermal discharges from the U. S. Steel-Lorain Works cause violations of the temperature standards in the Black River, and the discharge of oxygen-demanding wastes from this facility contribute to the violation of dissolved oxygen standards. In addition, the oil discharge from U.S. Steel Outfall 001 was causing violations of Section 3745-1-04(B) of the Ohio Water Quality Standards, despite being in compliance with current NPDES permit conditions. Upon reaching design flow, the discharge from the French Creek STP will become a significant factor in the dissolved oxygen balance in French Creek and in the Black River.

d. The classification of the main stem of the Black River as "water quality limiting" is warranted since conventional municipal secondary treatment for the Elyria and French Creek sewage treatment plants, and BPCTCA (Best Practicable Control Technology Currently Available) for the U.S. Steel-Lorain Works are not adequate to achieve water quality standards. Most remaining streams in the planning area should be similarly classified due to their low water quality design flow.

e. With minor exceptions, Ohio's warmwater habitat use designation and associated water quality criteria are achievable throughout the planning area with well demonstrated, conventional industrial and municipal treatment technologies. The seasonal warmwater habitat use designations is appropriate for limited reaches below the Brentwood Estates, Eaton Estates, Grafton, Lagrange, Lodi, and Oberlin STP's.

f. Maximum and average temperature standards for the lower Black River for the period 15 April to 15 June should be increased 3°F to reflect the response of the river to weather conditions and the recommended reduced thermal loadings at the U.S. Steel-Lorain Works.

3.2.16 The data from the 1979 survey demonstrated a significant increase in stream temperature caused by the U.S. Steel-Lorain Works and highlighted the impact of the Elyria STP and U.S. Steel discharges on decreased dissolved oxygen levels in the lower river. Concentrations as low as 2-3 milligrams per liter were recorded despite a river flow of 168 cfs. Problems with ammonia, cyanide, and phenolics were also noted in the river. A total cyanide concentration of 230 ug/l was recorded near U.S. Steel while the present water quality standard is 25 ug/l. Relatively high levels of metals were also detected. An intrusion of lake water into the Black River was

demonstrated. Currently, U.S. Steel and the Lorain STP contribute approximately 95 to 98 percent of the permitted discharges into the lower 3 miles of the Black River. Table EIS-4 presents the NPDES permit dischargers in the study area.

3.2.17 States are required to classify streams or segments of streams as either "water quality" or "effluent" limiting. Effluent limiting segments are those where applicable water quality standards are being met, or there is certainty that these standards will be achieved by application of effluent limitations. Water quality limiting segments are those where standards are not being achieved and where application of the above treatment levels is not sufficient to achieve water quality standards. The Black River main stem from the mouth to the confluence of the East and West Branches, has been classified as water quality limiting for the following parameters: dissolved oxygen; oil and grease; cyanide; phenolics; and ammonia. (SOURCE: Black River Waste Load Allocation Report, prepared by U.S. Environmental Protection Agency, 1980.)

Table EIS-4 - Permitted Dischargers to the Black River and Lake Erie

Discharger	Receiving Stream	Mile Point Main Stem	Flow (MGD)
Lorain Water Treatment Plant	Lake Erie	-	0.14
Ohio Edison-Edgewater Plant	Lake Erie	-	117.0
Lorain STP	Black River	0.2	14.3
AmShip	Black River	0.7	0.5
Lorain-Elyria Sand Co.	Black River	1.3	0.5
Ashland Oil Terminal	Black River	1.7	*
Koehring Co., Plant No. 1	Black River	1.9	0.003
U. S. Steel (5 Outfalls)	Black River	2.65-5.0	171.0

* Flow is variable.

SOURCE: Black River Waste Load Allocation Report, USEPA, November 1980.

3.2.18 The USF&WS also found the chemical water quality to be seriously degraded throughout the 6 miles of river investigated during their study in 1980 for their Intermediate Coordination Act Report. A chemical waste dump immediately across the river from the Elyria STP may also be a major source of pollutants and is presently being investigated by the Environmental Protection Agency. Both banks of the river in the vicinity of the U.S. Steel Plant were covered with a thick coat of oil from the discharges of U.S. Steel. An oil skimmer boom was found stretched across the river in the area on several occasions in the summer of 1979. Also, oil was seen entering the river from a storm sewer on the south side of the river immediately upstream of the 21st Street Bridge. The Lorain STP on the East Pier at the mouth of the river contributes to water quality problems in the lower river and Outer Harbor area.

3.2.19 The USEPA has cautioned that even with an in-depth study of all point and nonpoint pollution sources and their pollutants and abatement schedules; effectiveness and development of 208 water quality management plans; annual maintenance dredging; permit dredging; siltation rates, etc., an attempt to predict future water quality conditions of Lorain Harbor may be impractical (USEPA, January 1979). But, as stated previously, Ohio's warm-water habitat designation and associated water quality criteria are achievable within the project area with conventional industrial and municipal technologies (USEPA, November 1980). Therefore, the most probable future condition of the basin is that, with proper implementation and enforcement, water quality will meet State standards.

3.2.20 Aquatic Habitat. The proposed small-boat harbor site currently contains 70 acres of undredged bottom habitat. The site is protected from significant lake wave action by Lorain Harbor structures which provide additional benthic habitat. Since these structures utilize primarily steel sheet pile, the diversity in habitat they provide is minimal.

3.2.21 The abundance of benthic fauna is moderately high, with total organism density on the order of several thousand per square meter, but not as high as in the Inner Harbor, where density is on the order of several tens of thousands per square meter. The bottom sediments of the Outer Harbor are less polluted than those in the Inner Harbor, and are rated at moderately to heavily polluted.

3.2.22 The benthic fauna is dominated by sludgeworms of the genus Limnodrilus (Oligochaeta: Tubificidae) and by fly larvae and pupae of the genera Chironomus and Procladius (Chironomidae). Also present are the fingernail clams, Sphaerium and Pisidium (Heterodonta: Sphaeriidae), the flatworms Dugesia (Turbellaria: Planariidae), the amphipods Crangonyx and Gammarus (Gammaridae), the Oligochaete Branchiura, and the leech Helobdella (Hirudinea: Glossiphoniidae). These benthic organisms are the principal food source for most of the fish species that are common in the shallow waters of the area.

3.2.23 A moderately diverse fish community persists in Lorain Harbor in spite of rather limited physical habitat and degraded water quality. Within the last 10 years, 47 species of fish have been identified for the Outer

Harbor. During the same period of time, 41 species of fish have been collected within the lower reaches of the Black River. Gizzard shad and emerald shiner dominate catches in both the Outer Harbor and the lower river area. Freshwater drum, smelt, white bass, spottail shiner, trout-perch, and yellow perch are also common in the Outer Harbor. Trout-perch are also very common in the lower river along with carp, brown bullhead, and white sucker. The most common game fish caught in the Outer Harbor area are yellow perch, smallmouth bass, and channel catfish. Spawning and nursery habitat for fish are almost nonexistent in the lower river area and in the Outer Harbor; the habitat is severely limited because of deep navigation channel depths.

4. ENVIRONMENTAL EFFECTS

This chapter describes the effects of each detailed plan on the previously described significant resources. It contains a detailed analysis of the environmental consequences of each alternative, including the tentatively Selected Plan, and provides backup analysis for the Comparative Impacts of Alternatives Table (p. EIS-19).

Section 122 of the Rivers and Harbors Act of 1970 (PL 91-611) requires that impacts to certain resources be identified and evaluated. During the course of the planning process, the following resources were considered to be not significantly impacted and are not discussed further in this statement: noise, aesthetic values, community growth, tax revenues, property values, regional growth, employment/labor force, business and industrial activity, displacement of farms, man-made resources, and air quality. The minor impacts of the proposed alternative on these resources are discussed in the text of the Main Report. Only those resources which would be significantly affected by some or all of the alternatives currently under consideration are discussed below.

4.1 Alternative 2 - 1,500-Foot Breakwater.

4.1.1 Recreation. Recreational opportunities would benefit as a direct result of the addition of a 600-boat harbor at Lorain. In addition to the 600 permanently based boats which would be accommodated by the construction of Alternative 2, the three new launching ramps provided by the Port Authority would add an additional 8,547 launches of trailered boats per year to the existing capacity of the Lorain Harbor area.

4.1.2 Construction of Alternative 2 would necessitate the temporary disruption of current recreational boating activities at the proposed harbor site. Approximately 36 mooring spaces leeward of the existing floating breakwater would be displaced.

4.1.3 Fisherman access to the new breakwater would increase shore-based fishing opportunities in the Lorain area. The new breakwater would provide a peak capacity for 144 fishermen. In addition, the rubblemound breakwater should prove to be an attraction to desirable sport fish species for feeding and shelter.

4.1.4 Transportation. Since the proposed small-boat harbor entrance would funnel increased recreational traffic into the existing commercial navigation channel, some conflicts may develop. Proper harbor control and adherence to safe boating regulations would help minimize this impact.

4.1.5 Access route (Colorado Avenue) impacts are predicted to be relatively minor. This is due to the fact that improvements along Colorado Avenue are planned for completion well before small-boat harbor construction would begin. As a result, expected land transportation impacts would be limited to those associated with minor increases in local traffic congestion.

4.1.6 To a slight degree, some pleasure trips may be shifted away from conventional travel modes to vessels which would use the proposed harbor.

4.1.7 Public Utilities and Services. Increased use of the project site by fishermen and boaters would increase local demands for the public utilities and services, particularly during the recreation season. In a letter dated 22 June 1982, the city of Lorain has assured the Buffalo District that streets and emergency and public services including police, fire, ambulance, utilities, water, storm sewers, and sanitation are expected to handle the potential influx of recreational boats to the area and to service the new marina facility.

4.1.8 Public Health and Safety. Beneficial public safety impacts would result from increases in Lorain's capacity as a harbor-of-refuge for small craft. The new small-boat harbor would eliminate inconveniences - unavailability of docking space, conflicts with commercial ship traffic, and vertical clearance limitations at the Erie Avenue Bridge - experienced by boats seeking to escape dangerous lake conditions.

4.1.9 Water Quality. Breakwater construction and dredging and fill activities would result in a short-term increase in turbidity. Bottom sediments would be dredged from a 2 to 4-acre area (mostly likely northwest of the project site) and subsequently placed at the breakwater sites over about a 2-acre area. Due to the existing protected nature of the project site and the small quantity of material involved (6,700 cubic yards), no widespread dispersion of suspended solids is anticipated. Since the basin waters are relatively calm, suspended materials should settle out within a couple of hours, thereby minimizing the duration of these turbidity increases. For comparative purposes, turbidity impacts would be far less in both intensity and duration than those caused by a summer storm. Some inadvertent spilling of fuels, oil, and grease may also occur during construction.

4.1.10 Small boat use and operation of the fuel dock in the harbor would probably result in some oil, gas, and sewage spills, resulting in an adverse impact on water quality. Considering the existing degraded water quality in the Outer Harbor, this is not expected to be a major impact.

4.1.11 The presence of the breakwater implemented to provide safe navigation within the small-boat harbor, may result in further degradation in water quality in its lee. The breakwater would interrupt existing circulation patterns. Therefore, those pollutants introduced to the proposed harbor area by boats docked there would have a longer residency time than is the current case. Conversely, pollutants entering the Outer Harbor from the Black River would be deterred by the breakwater from entering the basin.

4.1.12 Aquatic Habitat. The construction of Alternative 2 would result in an avoidance of the project area by fish species during construction and possibly during periods of peak recreational boating activity. The new breakwater would permanently cover approximately 2.2 acres of benthic habitat. This would not be a major impact, since the sediments in the area are polluted and the benthic community is characteristic of moderately polluted bottoms.

4.1.13 Loss of bottom habitat due to breakwater construction also has a potential for impact on fish populations. For several reasons, however, the loss of bottom habitat should not significantly impact fish species. First, the area covered by the breakwater would be small relative to the total amount of such area available in the vicinity. Second, populations that would spawn in the area are not likely to be limited by spawning space. Third, yellow perch, one of the most abundant species using the area and the most important species in the local sport and commercial fisheries, has been shown to be very flexible in its feeding habits, changing its diet depending upon what food types are available.

4.1.14 In addition to covering bottom habitat, breakwater construction would create rocky, rubblemound habitat suitable for algal and invertebrate growth, and for shelter, feeding and spawning habitat for fish. Alternative 2 would create approximately 1.6 acres of such habitat. Fish species most likely to make use of this rocky habitat are yellow perch, white bass, freshwater drum, channel catfish, and walleye. Assuming no significant negative impacts from water quality degradation or loss of bottom habitat on these species, there is some potential for an increase in their populations near the new breakwaters. Since the amount of new breakwater required by this alternative is not large compared to the amount of such breakwater habitat already existing in the Outer Harbor, the increase in fish populations in the area in general would probably not be great.

4.1.16 Plan Economics. If Alternative 2 is implemented, initial investment costs would be \$3,450,000 and average annual costs would be \$382,300. Average annual benefits would total \$1,452,900, and net benefits (average annual benefits-average annual costs) would be \$1,070,600. The benefit/cost ratio (average annual benefits/average annual costs) for this alternative would be 3.8.

4.2 Alternative 5 - 800-Foot Breakwater.

4.2.1 Recreation. Recreational opportunities would benefit as a direct result of the addition of a 600-boat harbor at Lorain. In addition to the 600 permanently based boats which would be accommodated by the construction of Alternative 5, the three new launching ramps provided by the Port Authority would add an additional 8,547 launches of trailered boats per year to the existing capacity of the Lorain Harbor area.

4.2.2 Construction of Alternative 5 would necessitate the temporary disruption of existing recreational boating activities at the proposed harbor site. Approximately 36 mooring spaces leeward of current floating breakwater would be displaced.

4.2.3 Fisherman access to the new 800-foot breakwater would increase shore-based fishing opportunities in the Lorain area. The new breakwater would provide a peak capacity for 90 fishermen. In addition, both rubblemound breakwaters should prove to be an attraction to desirable sport fish species for feeding and shelter.

4.2.4 Transportation. Although Alternative 5 would provide a harbor entrance onto the commercial navigation channel, an alternate harbor entrance would be provided to the northeast. Therefore, the number of recreational-commercial traffic conflicts would be less for Alternative 2 than for Alternative 5.

4.2.5 Access route (Colorado Avenue) impacts are predicted to be relatively minor. This is due to the fact that improvements along Colorado Avenue are planned for completion well before small-boat harbor construction would begin. As a result, expected land transportation impacts would be limited to those associated with minor increases in local traffic congestion.

4.2.6 To a slight degree, some pleasure trips may be shifted away from conventional travel modes to vessels which would use the proposed harbor.

4.2.7 Public Utilities and Services. Increased use of the project site by fishermen and boaters would increase local demands for public utilities and services, particularly during the recreation season. In a letter dated 22 June 1982, the city of Lorain has assured the Buffalo District that streets, emergency and public services including police, fire, ambulance, utilities, water, storm sewers, and sanitation are expected to handle the potential influx of recreational boaters to the area and to service the new marina facility.

4.2.8 Public Health and Safety. Beneficial public safety impacts would result from increases in Lorain's capacity as a harbor-of-refuge for small craft. The new small-boat harbor would eliminate the inconveniences - unavailability of docking space, conflicts with commercial ship traffic, and vertical clearance limitations at the Erie Avenue Bridge - experienced by boats seeking to escape dangerous lake conditions. The alternate northeast entrance would increase the accessibility of the harbor by allowing boaters to avoid recreational and commercial traffic entering the Black River during these conditions.

4.2.9 Water Quality. Breakwater construction and dredging and fill activities would result in a short-term increase in turbidity. Bottom sediments would be dredged from a 2 to 4-acre area (most likely northwest of the project site) and subsequently placed at the breakwater site over about a 2-acre area. Due to the existing protected nature of the project site and the small quantity of material involved (6,700 cubic yards), no widespread dispersion of suspended solids is anticipated. Since the basin waters are relatively calm, suspended materials should settle out within a couple of hours, thereby minimizing the duration of these turbidity increases. For comparative purposes, turbidity impacts would be far less in both intensity and duration than those caused by a summer storm. Some inadvertent spilling of fuels, oil, and grease may also occur during construction.

4.2.10 Small boat use and operation of the fuel dock in the harbor would probably result in some oil, gas, and sewage spills, resulting in an adverse impact on water quality. Considering the existing degraded water quality in the Outer Harbor, this is not expected to be a major impact.

4.2.11 The presence of the breakwaters implemented to provide safe navigation within the small-boat harbor, may result in further degradation in water quality in their lee. The breakwaters would interrupt existing circulation patterns. Therefore, those pollutants introduced to the proposed harbor area by boats docked there would have a longer residency time than is the current case. Conversely, pollutants entering the Outer Harbor from the Black River would be deterred by the breakwaters from entering the basin.

4.2.12 Aquatic Habitat. The construction of Alternative 5 would result in an avoidance of the project area by fish species during construction and possibly during periods of peak recreational boating activity. The new breakwaters would permanently cover approximately 2.3 acres of benthic habitat. This would not be a major impact, since the sediments in the area are polluted and the benthic community is characteristic of moderately polluted bottoms.

4.2.13 Loss of bottom habitat due to breakwater construction also has a potential for impact on fish populations. For several reasons, however, the loss of bottom habitat should not significantly impact fish species. First, the area covered by the breakwater would be small relative to the total amount of such area available in the vicinity. Second, populations that would spawn in the area are not likely to be limited by spawning space. Third, yellow perch, one of the most abundant species using the area and the most important species in the local sport and commercial fisheries, has been shown to be very flexible in its feeding habits, changing its diet depending upon what food types are available.

4.2.14 In addition to covering bottom habitat, breakwater construction would create rocky, rubblemound habitat suitable for algal and invertebrate growth, and for shelter, feeding and spawning habitat for fish. Alternative 5 would create approximately 1.7 acres of such habitat. Fish species most likely to make use of this rocky habitat are yellow perch, white bass, freshwater drum, channel catfish, and walleye. Assuming no significant negative impacts from water quality degradation or loss of bottom habitat on these species, there is some potential for an increase in their populations near the new breakwaters. Since the amount of new breakwater required by this alternative is not large compared to the amount of such breakwater habitat already existing in the Outer Harbor, the increase in fish populations in the area in general would probably not be great.

4.2.15 Plan Economics. If Alternative 5 is implemented, initial investment costs would be \$3,500,000, and average annual costs would be \$419,200. Average annual benefits would total \$1,434,800, and net benefits would be \$1,015,300. The benefit/cost ratio for this alternative would be 3.42.

4.3 Alternative 6 - No Action.

4.3.1 Recreation. Privately owned marinas seem constrained from attaining significantly larger capacities. Launching facilities would remain crowded, inducing boaters to avoid trailered boat usage in the area. People desiring the larger, nontrailerable boats would be induced to own smaller

craft or search for slip space at other more distant locations. The city of Lorain's attempts to provide temporarily increased mooring capacity would remain limited so that slip demands would continue to outstrip supply. The floating breakwater project is expected to last 6 to 10 years.

4.3.2 When the Diked Disposal Area is filled, the Lorain area fishing capacity would be expected to increase since the dike would become more accessible. A park is planned on the disposal area which may further increase future fishing usage there due to improved parking and other potential support facilities.

4.3.3 In general, if no Federal action is taken to construct a small-boat harbor, the city of Lorain may lose an opportunity to enhance the recreational use of Lake Erie. Local users would continue to experience overcrowding at existing facilities. Demands for boating and fishing recreation would far exceed opportunities for fulfillment.

4.3.4 Transportation. Two street improvement programs, one in connection with Colorado Avenue (State Route 611) and a second in association with the development of the park at the present diked disposal site, are expected to provide needed access to the lakefront.

4.3.5 Proposed improvements to Lorain Harbor for commercial navigation would increase local commercial traffic.

4.3.6 Public Utilities and Services. No impact is anticipated.

4.3.7 Public Health and Safety. If no Federal action is taken to increase Lorain's capacity as a harbor-of-refuge, existing congestion problems would continue to threaten the safety of recreational boaters during periods of adverse lake conditions.

4.3.8 Water Quality. Improvements in the treatment of industrial and municipal wastes are expected to improve water quality in the Lorain Harbor area.

4.3.9 Aquatic Habitat. Improved sediment and water quality can be expected to favor an increase in the diversity of both benthic and nektonic species.

4.3.10 Plan Economics. The No Action alternative would have average annual costs of \$0, average annual benefits of \$0, net benefits of \$0, and no B/C ratio.

5. LIST OF PREPARERS

5.1 The following people were primarily responsible for preparing this Environmental Impact Statement.

<u>Name</u>	<u>Discipline/ Expertise</u>	<u>Experience</u>	<u>Role in Preparing EIS</u>
Philip E. Berkeley	Biology/Aquatic	Seven years, EIS studies, Buffalo District	General EIS Review
Maryjo A. Braun	Political Science/ Social Science	Four years, EIS studies, Buffalo District	Socioeconomic Impacts
William E. Butler	Geography/ Physical, Social	Three years, EIS studies, Buffalo District	EIS Coordinator, Socioeconomic Impacts
Timothy T. Daly	Social Science/ Cultural Resources	Five years, EIS studies, Buffalo District	Cultural Resources Impact Assessment
Edward J. Gustek	Civil Engineering	Seven years, Design Branch; 3 years Project Manager, Buffalo District	Project Manager, Formulation of Alternatives, Needs Evaluation
Charles Zernentsch	Civil Engineering	Three years, Hydraulic and Hydrologic Branch; seven years, Maintenance and Operations Branch; three years, Planning Branch, Buffalo District	Final Feasibility Report Coordinator

6. PUBLIC INVOLVEMENT

This section describes public involvement in the study and how public views guided and were incorporated into the study's decision-making process. It is presented in the following four discussions:

a. Public Involvement Program. This discussion describes the means used to involve the public in the study and the major results of such involvement, including scoping activities.

b. Required Coordination. This section describes remaining required coordination with other agencies and groups, particularly coordination that is to be satisfied by circulation of the EIS for review and comment.

c. Statement Recipients. This section lists agencies, groups, and individuals to whom copies of the EIS were sent.

d. Public Views and Responses. This section describes public views that have had a major influence on the study and how such views were incorporated into the study's decisionmaking process.

6.1 Public Involvement Program

6.1.1 Participation in this study by other governmental and public entities was encouraged through correspondence, telephone conversations, and personal visits. In addition, three public workshops were held during preliminary feasibility study efforts. These meetings were attended by individuals representing commercial, social, environmental, recreational, governmental and planning interests.

6.1.2 An Orientation Workshop was held at Lorain City Council Chambers on 5 November 1980. The purpose of the workshop was to describe the study process; obtain public views on potential small-boat harbor sites; and obtain input relevant to recreational boating demands and resources. Mr. John Sulpizio of the Lorain Port Authority made substantive remarks regarding city plans for a floating breakwater marina near the East Breakwater (completed in 1981). He and others were interested in possible marina sites to the east of the Diked Disposal Area. Other siting recommendations included Beaver Creek, berthing within the Diked Disposal Area, and restudying the West Breakwater site. All, except the altered use of the Diked Disposal Area, were accepted into the study.

6.1.3 Most participants agreed that a significant shortage of available berthing capacity, especially for sailboats, exists at Lorain. The U.S. Coast Guard expressed concern for more staffing as boating activity increases. In general, there appeared to be a very positive local response toward the need for a small-boat harbor at Lorain. However, opinions varied as to proper site and size of the harbor.

6.1.4 An Initial Iteration Workshop was conducted at Lorain City Council Chambers on 10 December 1980. At this meeting, evaluations and tentative conclusions pertaining to site selection were presented. Comparative

evaluations of each site's response to major engineering, economic, environmental, and social factors were presented. A composite of all these evaluations was presented to demonstrate the overall ranking of the alternative sites. The "Inside East Breakwater" site was rated highest. A tentative conclusion was made that this site be selected for further study because of its overall superiority and its potential for implementation.

6.1.5 There were no adverse comments relative to tentative selection of the "Inside East Breakwater" site, and no recommendations to select any other site. In general, attendees seemed pleased with the progress of the preliminary feasibility study.

6.1.6 An Alternatives Workshop was held at Lorain City Council Chambers on 10 September 1981, to display and compare harbor design concepts and select alternative plans for further study. Comparisons of economically feasible plans were made within two separate categories: those plans which do not incorporate a Riverside Park channel cut (Alternatives 1, 2, and 5) and those which do (Alternatives 3 and 4). Selection of at least one plan from each category was advised since, at the time, the decision on a Riverside Park cut was still undetermined.

6.1.7 Within the first category, Alternative 1 was not favored by anyone present. General reaction was recorded that the capacity limitation of Alternative 1 made it less preferable than the somewhat more costly Alternatives 2 and 5. Alternative 2 was selected by attendees as being preferable to Alternative 5 because the additional cost for increased entrance safety in Alternative 5 was judged as probably unnecessary.

6.1.8 For those plans allowing the Riverside Park cut, Alternative 3 was preferred by attendees since the dry-storage facility of Alternative 4 could be added at any time by non-Federal interests. Responses were noted which favored the dry-storage facility as a potential add-on to any of the harbor configuration plans.

6.1.9 No adversity to project results was recorded on the basis of social or environmental impacts. Expected boating demand figures (640 boats in the year 1990, and 1,020 boats in the year 2000) were not challenged as being overly optimistic. In general, attendees seemed anxious that a recreational harbor configuration with large capacity and conforming to final commercial channel plans be implemented as soon as practicable at the inside East Breakwater location.

6.2 Required Coordination.

6.2.1 The National Environmental Policy Act of 1969 (NEPA) requires that this DEIS be circulated for review and comment to all Federal and State agencies having jurisdiction by law or special expertise with respect to any environmental impact involved, or which is authorized to develop and enforce environmental standards. In order to obtain full compliance with the Coastal Zone Management Act, National Historic Preservation, Clean Air Act, Federal Water Project Recreation Act, and Land and Water Conservation Fund Act, this DEIS has been circulated to the appropriate Federal and State agencies for

review and comment. Comments will also be requested from all other parties on the project mailing list and from State and local clearinghouses. This DEIS, any comments received, and any underlying documents will be made available to the general public pursuant to the provisions of the Freedom of Information Act (5 USC 552).

6.2.2 A Public Notice and evaluation in compliance with Section 404 of the Clean Water Act have been completed and are included with this EIS (see pp. EIS-44-EIS-54). Any person who has an interest which may be adversely affected by the construction of the tentatively Selected Plan will be provided an opportunity to request a public hearing. A Section 401 State Water Quality Certificate, or waiver thereof, will be obtained from the Ohio Environmental Protection Agency upon their favorable review of the Section 404 Evaluation.

6.2.3 In accordance with the Fish and Wildlife Coordination Act, a final Fish and Wildlife Coordination Act report will be obtained and discussed in the Final EIS and included as an appendix.

6.3 Statement Recipients.

6.3.1 The following agencies, groups and individuals were sent copies of this Draft Final Feasibility Report and DEIS for review and comment:

a. Federal.

Advisory Council on Historic Preservation
Federal Emergency Management Administration
Federal Maritime Commission
Great Lakes Fishery Commission
U. S. Department of Agriculture
U. S. Department of Commerce
U. S. Department of Energy
U. S. Department of Health and Human Services
U. S. Department of Housing and Urban Development
U. S. Department of the Interior
U. S. Department of Transportation
U. S. Environmental Protection Agency

b. State.

Ohio State Clearinghouse
Ohio Department of Health
Ohio Environmental Protection Agency
Ohio Department of Natural Resources
Ohio Department of Energy
Ohio Historic Preservation Office
Ohio Department of Transportation

c. Local.

Lorain County Planning Commission
Lorain Planning Commission
Lorain Department of Transportation
Lorain Port Authority
Lorain Public Libraries
Lorain Engineer
Lorain Chamber of Commerce

d. Public Officials.

Honorable Richard F. Celeste, Governor
Honorable John Glenn, U. S. Senator
Honorable Howard M. Metzenbaum, U. S. Senator
Honorable Donald J. Pease, U. S. Representative

e. Private Organizations and Individuals.

Great Lakes Tomorrow
National Wildlife Federation

6.4 Public Views and Responses.

6.4.1 Public input, in the form of statements presented through public meetings, technical workshops, written correspondence, and informal interviews, have influenced this study and have been incorporated into the decision-making process. Through formal workshops, input was obtained regarding alternative harbor sites, recreational boating demands and resources, and harbor design concepts.

6.4.2 On 13 May 1982, the City of Lorain was consulted in order to assess the capacity of existing streets, and public services and utilities to handle the potential influx of recreational boaters to the area and service the proposed marina facility. The city responded that all necessary streets, utilities, and services could adequately accommodate this increased use. On 22 June 1982, the Lorain County Planning Commission was contacted in order to assess the relationships between the proposed Corps project and the plans of other agencies. Downtown development plans for Lorain prepared by the Commission have shown, and recommended, the development of a small-boat harbor at the selected site since 1978.

6.4.3 The only concern which has been expressed by the USF&WS is the indirect effect of the proposed breakwaters on water quality due to impaired circulation. USF&WS recommended that culverts or other flow-through systems be installed in the breakwaters to reduce circulation problems. The Buffalo District has determined, however, that the placement of culverts would have minimal effect on increasing circulation in the basin. The volume of flow which would pass through the culverts would be very small in comparison to the volume of the basin. The reason for this minor flow is due to the lack of differential elevation between the water level in the basin

and the lake. Also, since Lorain Harbor nutrient and waste loadings originate mainly from upstream industrial, municipal and agricultural sources, the breakwaters may, in effect prevent these pollutants from entering the basin. To address potential water quality problems originating from within the basin, the local cooperator (Lorain Port Authority) would be required to prohibit the discharge of pollutants into the waters of the proposed small-boat harbor. If water quality degradation becomes a problem at the harbor, post-construction mitigation would be investigated further.

6.4.4 Coordination with the Regional Archaeological Preservation Office, Cleveland, OH; the Ohio Historic Preservation Office; and the National Park Service has determined that the proposed small-boat harbor would not impact upon any archaeological sites or historic properties.

7. INDEXES, REFERENCES, AND APPENDICES

(Tentatively Selected Plan is Alternative 5)

Subject	Environmental Impact Statement (pgs)	Main Report (References Incorporated) (pgs)	Report Appendices (References Incorporated) (Appendices)
Affected Environment	: EIS-21-EIS-30 :	: 6-17 :	: B, C :
Alternatives	: EIS-11-EIS-20 :	: 22-32 :	: D :
Aquatic Habitat	: EIS-29-EIS-30 :	: 14 :	: C :
Areas of Controversy	: EIS-4 :	: - :	: - :
Comparative Impacts of Alternatives	: EIS-19 :	: 33-34 :	: C :
Cover Sheet	: EIS-1 :	: - :	: - :
Environmental Conditions	: EIS-21-EIS-23 :	: 6-17 :	: C :
Environmental Effects	: EIS-28-EIS-36 :	: 36-37 :	: C :
List of Preparers	: EIS-37 :	: - :	: - :
Major Conclusions and Findings	: EIS-2-EIS-4 :	: 44-45 :	: - :
Need for and Objectives of Action	: EIS-8-EIS-12 :	: 17-18 :	: B :
Plan Economics	: EIS-33, 35, 36 :	: 37-38 :	: B :
Planning Objectives	: EIS-10 :	: 19 :	: - :
Plans Considered in Detail	: EIS-16-EIS-20 :	: 33-34 :	: D :
Plans Eliminated from Further Study	: EIS-11-EIS-15 :	: 22-32 :	: - :
Public Concerns	: EIS-8-EIS-10 :	: 17-18 :	: - :
Public Health and Safety	: EIS-26 :	: 18 :	: - :
Public Involvement	: EIS-38-EIS-42 :	: 18 :	: C :
Public Involvement Program	: EIS-38-EIS-39 :	: 18 :	: - :
Public Utilities and Services	: EIS-26 :	: - :	: C :
Public Views and Responses	: EIS-41-EIS-42 :	: 43 :	: C :
Relationship to Environmental Requirements	: EIS-5 :	: - :	: C :
Required Coordination	: EIS-39-EIS-41 :	: - :	: C :
Significant Resources	: EIS-23-EIS-30 :	: 6-17 :	: C :
Statement Recipients	: EIS-40-EIS-41 :	: - :	: - :
Study Authority	: EIS-8 :	: 1 :	: - :
Summary	: EIS-2-EIS-5 :	: - :	: - :
Table of Contents	: EIS-6-EIS-7 :	: 1-v :	: - :
Transportation	: EIS-25-EIS-26 :	: 13-14 :	: C :
Unresolved Issues	: EIS-4 :	: - :	: - :
Water Quality	: EIS-26-EIS-29 :	: 8 :	: - :
Without Conditions (No Action)	: EIS-15-EIS-16 :	: 15-17 :	: C :



DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
1776 NIAGARA STREET
BUFFALO, NEW YORK 14207

PUBLIC NOTICE

JUN 10 1983

RECREATIONAL NAVIGATION STUDY
LORAIN, OHIO

This Public Notice has been prepared and distributed pursuant to Section 404 of the Clean Water Act (33 USC 1344). Specifically, its purpose is to specify what fill materials would be discharged into the waters of the United States by implementation of the proposed project. This notice provides an opportunity for any person who may be affected by such discharge to submit comments or request a public hearing.

Lorain, OH, is located on the southern shore of Lake Erie, approximately 25 miles west of Cleveland and 90 miles east of Toledo. The city is situated at the mouth of the Black River as shown in Figure EIS-3.

The geographical limits for the Lorain Recreational Navigation study include: the triangular Outer Harbor; 2 miles of the coastline in either direction from the mouth of the Black River; and the Federally maintained Inner Harbor (from the river mouth to a point about 3 miles upstream).

The proposed plan would provide an all-weather small-boat harbor with a 600-slip capacity located inside the East Breakwater Shorearm. A rubblemound breakwater, 800 feet in length, would bound the northwest edge of the basin area. A 425-foot long detached rubblemound breakwater at the harbor entrance would provide wave protection to boats entering or exiting the harbor to the southwest and to the northeast. Approximately 6,700 cubic yards of bottom sediments would be dredged from nearby areas and used to fill depressions in the lake bottom in order to give the breakwaters a flat foundation. The breakwaters would have a crest height of 8 feet above LWD and would protect a water area of about 40 acres. Land-based recreational fishing opportunities would be provided by a fisherman walkway and handrail on the 4-foot wide concrete cap of the 800-foot breakwater. Since existing water depths range from 6 to 18 feet below LWD, no channel or basin dredging would be required. Project features and the harbor layout are depicted in Figure EIS-2. Figure EIS-2 also presents a typical breakwater cross section. Land support facilities would be located on the Diked Disposal Area which is expected to be filled by 1989. The Lorain Port Authority, the Local Cooperator, would be responsible for providing all support facilities, including docks, mooring facilities, sanitary facilities, etc.

In accordance with the National Environmental Policy Act of 1969, a Draft Environmental Impact Statement, which includes the Section 404 Evaluation, has been released for public review and comment.

Consultation with the Ohio State Historic Preservation Office and the National Park Service has concluded that no registered properties or properties listed as being eligible for inclusion in the National Register of Historic Places would be affected by this project.

Based on the review of available environmental data and consultation with the U.S. Fish and Wildlife Service, we have determined that the proposed work would not affect any species proposed by the U.S. Department of the Interior or the Ohio Department of Natural Resources as threatened or endangered, nor would it affect the critical habitat of any such species. Therefore, unless additional information indicates otherwise, no further consultation pursuant to Section 7 of the Endangered Species Act Amendments of 1978 will be undertaken with the U.S. Fish and Wildlife Service.

This project is being reviewed under the following applicable laws:

- a. Section 313 of the Federal Water Pollution Control Act (33 USC 1323, 86 Stat 816).
- b. Section 307(c)(1) and (2) of the Coastal Zone Management Act of 1972 (16 USC 1456(c)(1) and (2), 86 Stat 1280).
- c. The National Environmental Policy Act of 1969 (42 USC 4321-4347).
- d. The Fish and Wildlife Act of 1956 (16 USC 427a, et seq.).
- e. The Endangered Species Act of 1973 (16 USC 668aa-668cc-6 P.L. 93-205, 87 Stat 884).
- f. The National Historic Preservation Act of 1966 (80 Stat 915, 16 USC 470).

Preliminary assessment (as discussed in the Section 404 Evaluation) concludes that the proposed construction work would not cause unacceptable disruption to the water quality uses of the affected aquatic ecosystem.

This notice is being published in conformance with 33 U.S. Code of Federal Regulation 209.145. Any person who has an interest which may be adversely affected by the construction of this project, may request a public hearing. The request must be submitted in writing to the District Engineer within 30 days of the date of this Notice and must clearly set forth the interest which may be affected and the manner in which the interest may be affected by this activity. Comments from the interested public are invited.

ROBERT R. HARDIMAN
Colonel, Corps of Engineers
District Engineer

1 Enclosure
as stated

NOTICE TO POSTMASTER: It is requested that the above notice be conspicuously displayed for 30 days from the date of issuance.

SECTION 404(b)(1) EVALUATION
RECREATIONAL NAVIGATION STUDY
LORAIN, OHIO

1. Project Description.

1.1 Location.

Lorain, OH, is located on the southern shore of Lake Erie, approximately 25 miles west of Cleveland and 90 miles east of Toledo. The city is situated at the mouth of the Black River as shown in Figure 1.

The geographical limits for the Lorain Small-Boat Harbor Study include: the triangular Outer Harbor; 2 miles of the coastline in either direction from the mouth of the Black River; and the Federally maintained Inner Harbor (from the river mouth to a point about 3 miles upstream).

1.2 General Description.

The proposed plan would provide an all-weather small-boat harbor with a 600-slip capacity located inside the East Breakwater Shorearm. A rubblemound breakwater, 800 feet in length, would bound the northwest edge of the basin area. A 425-foot long detached rubblemound breakwater at the harbor entrance would provide wave protection to boats entering or exiting the harbor to the southwest and to the northeast. The breakwaters would have a crest height of 8 feet above LWD and would protect a water area of about 40 acres. Land-based recreational fishing opportunities would be provided by a fisherman walkway and handrail on the 4-foot wide concrete cap of the 800-foot breakwater. Since existing water depths range from 6 to 18 feet below LWD, no dredging would be required. Project features and the harbor layout are depicted in Figure 2.

Figure 3 presents a typical breakwater cross section. Land support facilities would be located on the Diked Disposal Area which is expected to be filled by 1989. The Lorain Port Authority, the Local Cooperator, would be responsible for providing all support facilities, including docks, mooring facilities, sanitary facilities, etc.

1.3 Authority and Purpose.

In response to a resolution by the Committee on Public Works and Transportation of the House of Representatives, dated 23 September 1976, a reconnaissance study was initiated to review Lorain Harbor needs. The resolution is quoted below:

"Resolved by the Committee on Public Works and Transportation of the House of Representatives, United States, that the Board of Engineers for Rivers and Harbors is hereby requested to review the report on Lorain Harbor, Ohio, published in House Document No. 166, 86th Congress, 1st Session, and other pertinent reports, with view of determining whether any modification to the recommendations contained therein is advisable at the present time, including consideration of the passage and safe navigation of new and larger ships operating on the Great Lakes."

The reconnaissance report, completed in January 1979, identified excess recreational boating and fishing demands at Lorain and recommended the study of potential resource improvements. Authorization for this investigation thereby originated from the House resolution.

1.4 General Description of Fill Materials.

1.4.1 General Characteristics of Material - The primary materials which would be required to construct this project include: dredged fill (silt, sand and/or gravel), underlayer/bedding stone (15 to 150 pounds each), and armor stone 750 to 1,600 pounds each). Paragraphs 3.1.7 and 3.1.8 of the Environmental Impact Statement summarizes the results of bulk chemical analysis of lake bottom sediments within the project area.

1.4.2 Quantity of Material - Breakwater construction would involve the placement of 51,815 tons of underlayer/bedding stone and 18,300 tons of armor stone. Approximately 6,700 cubic yards of bottom sediments would be dredged from nearby areas and used to fill depressions in the lake bottom in order to give the breakwaters a flat foundation.

1.4.3 Source of Material - All stone construction materials would be obtained from commercial quarries within a 60-mile radius of the project site. Dredged fill material would be obtained from adjacent sites in the East Harbor area.

1.5 Description of the Proposed Discharge Site.

1.5.1 Location - All proposed work would be confined to the East Basin of the Lorain Outer Harbor (see Figure 2, preceeding).

1.5.2 Size - Approximately 2.3 acres of lake bottom would be involved in the construction work.

1.5.3 Type of Site - The proposed discharge site is unconfined.

1.5.4 Type of Habitat - The proposed discharge site currently consists of undredged bottom habitat.

1.5.5 Timing and Duration of Discharge - The timing and duration of the construction work would be determined at a later date.

1.6 Description of Discharge Method.

Dredged fill material would be placed on the lake bottom at the breakwater site with a clam shell bucket. The breakwater construction procedure which would probably be followed is to use derrick boats to place the quarry stone which would be transported to the site on scows towed by tug boats. Placement of the stone would be accomplished utilizing a crane equipped with rock grapples.

2. Factual Determinations (Section 230.11).

The breakwater materials to be used are chemically inert and physically immobile under existing conditions. These characteristics eliminate the possibility of chemical-biological interaction and any testing specified under Section 230.61 is not applicable in this instance.

The results of chemical testing of bottom sediments within the proposed project site completed in 1981 was used in making the required determinations (para. 3.1.7-3.1.8 of the EIS). Since the discharge site is adjacent to the extraction site, and subject to the same sources of contaminants, and materials at the two sites are substantially similar; the fact that the material to be discharged may be a carrier of contaminants is not likely to result in degradation of the disposal site. Therefore, no further testing is considered necessary.

2.1 Physical Substrate Determinations (Sections 230.11(a) and 230.20).

2.1.1 That portion of the breakwaters which would be below the ordinary highwater mark for Lake Erie (572.8 above Mean Water Level at Father Point, Quebec, IGLD, 1955) would have a 35-foot wide surface with a 1V:1.5H slope along the armor layer, and a 5-foot wide horizontal bench and 1V:1.5H slope along the underlayer.

2.1.2 Sediment Type - Breakwater construction would necessitate the replacement of the existing silt and sand substrate with a rock substrate.

2.1.3 Fill Material Movement - No changes in the substrate as a result of erosion, slumpage, or other movement of the stone are anticipated outside of the discharge site.

2.1.4 Physical Effects on Benthos - The placement of fill material and stone would adversely affect bottom-dwelling organisms at the site by smothering immobile forms or forcing mobile forms to migrate. The submerged portions of the breakwaters would be available for recolonization by benthic organisms from nearby areas and by those that survive construction.

2.1.5 Other Effects - Some compaction of the existing substrate would occur.

2.2 Water Circulation and Salinity Determinations.

2.2.1 Water (Sections 230.11(b), 230.22, and 230.55).

a. Salinity - N/A.

b. Water Chemistry - No effect.

c. Clarity - Construction activities would result in a short-term increase in turbidity.

- d. Color - No effect.
- e. Odor - No effect.
- f. Taste - No effect.
- g. Dissolved Gas Levels - No effect.
- h. Nutrients - No effect.
- i. Eutrophication - No effect.

2.2.2 Current Patterns and Circulation (Sections 230.11(b) and 230.3)

a. Current Pattern and Flow - The proposed harbor configuration would be a closed system with little exchange through the narrow entrance due to lack of tides, streamflow or any other mechanism which would initiate volume exchange. Eddies from Black River flood currents and wave activity would only influence the entrance to the marina, not the basin itself. The result would be a possible buildup of pollutants originating from the harbor vessels.

b. Velocity - Due to the existing protected nature of the harbor site, current velocities would not be significantly affected by the additional breakwaters.

- c. Stratification - No effect.
- d. Hydrologic Regime - No effect.

2.2.3 Normal Water Level Fluctuations (Sections 230.11 and 230.44) - No effect.

2.2.4 Salinity Gradients (Sections 230.11(b) and 230.25) - N/A.

2.2.5 Actions that Would be Taken to Minimize Impacts (Subpart 4) - Without exchange, the water quality of the basin could degenerate to an objectionable level if policing measures are not enforced. Small-boat harbors, by their nature, generally result in a degradation in water quality. Culverts or other flow-through systems would be of little help in alleviating this problem. Without being able to quantitatively predict the future water quality of the enclosed basin, no mitigation measures are presented here except to require strict control measures by the Lorain Port Authority.

2.3 Suspended Particulate/Turbidity Determinations.

2.3.1 Expected Changes in Suspended Particulates and Turbidity in the Vicinity of the Discharge Site (Sections 230.11(c) and 230.21) - Construction of the new breakwaters is expected to increase local turbidity during the actual work period. Propeller agitation of the bottom sediments would also increase turbidity, particularly during peak recreation periods. No violations of State water quality standards are anticipated.

2.3.2 Effects on Chemical and Physical Properties of the Water Column (Section 230.210)

- a. Light Penetration - Construction activities and the presence of docks and boats would decrease light penetration at the project site.
- b. Dissolved Oxygen - No effect.
- c. Toxic Metals and Organics - No effect.
- d. Pathogens - No effect.
- e. Aesthetics - Increased turbidity in the project area may be aesthetically displeasing.

2.3.3 Effects on Biota (Section 230.21)

- a. Primary Production, Photosynthesis - No significant effect.
- b. Suspension/Filter Feeders - No significant effect.
- c. Sight Feeders - No significant effect.

2.4 Contaminant Determinations Section 230.11(d)).

The breakwater material, consisting of clean, quarry run stone, would not introduce, relocate, or increase contaminants. The placement of dredged fill material would not introduce new contaminants to the project site. However, some contaminants would be relocated from similar nearby areas to the breakwater construction site and the total volume of contaminants would increase slightly.

2.4.1 Actions Taken to Minimize Impacts (Subpart H) - Since the substrate at the fill site is similar to the dredged material being discharged, the effects of the discharge would be minimized. Breakwater construction would, in effect, cap the dredged material and control it after the discharge.

2.5 Aquatic Ecosystems and Organism Determinations (Section 230.11(3)).

2.5.1 Effects on Plankton - No significant effect.

2.5.2 Effects on Benthos - The placement of dredged material and stone would destroy and cover immobile bottom-dwelling organisms. The new stone substrate should provide a more diverse benthic habitat and should more than compensate for the existing substrate that would be covered.

2.5.3 Effects on Nekton - Free-swimming aquatic organisms would temporarily avoid the project area during construction and peak recreation periods. The new breakwaters should prove to be an attraction for local fish species as shelter and feeding sites.

2.5.4 Effects on Aquatic Food Web (Section 230.31) - No significant effect.

2.5.5 Effects on Special Aquatic Sites

- a. Sanctuaries and Refuges (Section 230.40) - N/A.
- b. Wetlands (Section 230.41) - N/A.
- c. Mud Flats (Section 230.42) - N/A.
- d. Vegetated Shallows (Section 230.43) - N/A.
- e. Coral Reefs (Section 230.44) - N/A.
- f. Riffle and Pool Complexes (Section 230.42) - N/A.

2.5.6 Threatened and Endangered Species (Section 230.30) - No effect.

2.5.7 Other Wildlife (Section 230.32) - Disruption and disturbance by equipment during construction activities would result in a short-term avoidance of the project area by both game and nongame bird species. No significant wildlife habitat would be impacted.

2.5.8 Actions to Minimize Impacts (Subpart H) - During construction, the Contractor would be required to minimize turbidity and accidental spills of fuels, oils, greases, etc.

2.6 Proposed Disposal Site Determinations.

2.6.1 Mixing Zone Determination (Section 230.11(f)(2)) - Since the purpose of the dredged material placement is to fill a depression (approximately 22 feet below LWD), the widespread dispersion of material would be kept at a minimum. The filling activity should not be adversely affected by currents or turbulence since the project site is protected by Lorain Harbor breakwaters. Due to this protected nature of the discharge site and the material characteristics (i.e., primarily sand and silts), settling velocities should be relatively rapid. Since the breakwater material would consist of inert stone, a mixing zone determination would not be applicable for this project feature.

2.6.2 Determination of Compliance with Applicable Water Quality Standards - The proposed discharge would be in compliance with the State of Ohio's Lake Erie Standards (3745-1-11) and Standards Applicable to All Waters (3745-1-04) in that it would not interfere with or become injurious to existing designated uses nor would it introduce harmful or toxic conditions or substances.

2.6.3 Potential Effects on Human Use Characteristics

- a. Municipal and Private Water Supply (Section 230.50) - No effect.

b. Recreational and Commercial Fisheries (Section 230.51) - No effect.

c. Water Related Recreation (Section 230.52) - The construction of the small-boat harbor would enhance boating and fishing opportunities in the Lorain area.

d. Aesthetics (Section 230.53) - Construction would temporarily increase turbidity, thereby detracting from the appearance of the nearshore area. The presence of the breakwaters may detract from the existing view of the Outer Harbor area.

e. Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves (Section 230.54) - The breakwaters may disrupt the view of the West Breakwater Lighthouse, a structure listed in the National Register of Historic Places from the shore. However, the fisherman walkway along the attached breakwater would provide a new prospect from which to view this historic landmark.

2.7 Determination of Cumulative Effects on the Aquatic Ecosystem (Section 230.11(g)).

Due to the limited space available, additional discharges in the project area are not anticipated. No effect.

2.8 Determination of Secondary Effects on the Aquatic Ecosystem (Section 230.11(h)). Increased recreational boating use of the project area and accidental spills of fuel, oil, grease, and sewage would adversely affect the aquatic ecosystem.

FINDING OF COMPLIANCE
FOR
RECREATIONAL NAVIGATION STUDY
LORAIN, OHIO

1. No significant adaptations of the Section 404(b)(1) guidelines were made relative to this evaluation.
2. Five alternatives were initially considered as potential small-boat harbor sites. Alternative Site 2 (East of Diked Disposal Area) would have required massive breakwater protection. Alternative Site 3 (Inside West Breakwater) would have interfered with commercial shore-based activities and would disrupt an area heavily used by sport fishermen. Alternative Site 4 (Black River at 21st Street Bridge) would have resulted in the destruction of the 21st Street wetland. Alternative Site 5 (Beaver Creek) would have resulted in downdrift erosion, sedimentation within the basin, and the possible destruction of wetlands or transition zones. Therefore, the proposed discharge site was selected because it provides an opportunity to utilize an advantageous water area (existing depths, wave protection, and shoreline armoring are favorable) to enhance a future recreational park without detrimental social or environmental conflicts.
3. The planned placement of fill material at the project site would not violate any applicable State water quality standards. The construction operation would not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.
4. Use of the tentatively selected fill site would not harm any endangered species or their critical habitat.
5. The proposed placement of fill material would not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, shellfish, wildlife, or special aquatic sites. The life stages of aquatic life and other wildlife should not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values would not occur.
6. Appropriate steps to minimize potential adverse impacts of the discharge aquatic systems include proper marina maintenance and the responsible handling of fuel and sewage. During construction, the Contractor would be required to minimize turbidity and accidental spills of fuels, oils, greases, etc.

7. On the basis of the guidelines, the proposed disposal site for the discharge of fill material is specified as complying with these guidelines.

ROBERT R. HARDIMAN
Colonel, Corps of Engineers
District Engineer

Date _____

